DOCUMENT RESUME

ED 384 706 CE 067 750

AUTHOR	Welton, Michael
TITLE	Toward Development Work: The Workplace as a Learning Environment. EEE701 Adults Learning: The Changing Workplace B.
INSTITUTION	Deakin Univ., Victoria (Australia).
SPONS AGENCY	Victorian Education Foundation.
REPORT NO	ISBN-0-7300-1354-5
PUB DATE	91
NOTE	112p.
AVAILABLE FROM	Adult and Workplace Education, Faculty of Education, Deakin University, Geelong, Victoria, Australia 3217 ($20 Australian).
PUB TYPE	Guides - Classroom Use - Instructional Materials (For Learner) (051)
EDRS PRICE	MF01/PC05 Plus Postage.
DESCRIPTORS	*Adult Development; Adult Education; *Adult Learning; Annotated Bibliographies; Curriculum Development; *Educational Environment; Educational Opportunities; *Education Work Relationship; *Experiential Learning; Foreign Countries; Industrial Structure; Industrial Training; Labor Force Development; Models; On the Job Training; Personnel Management; Technological Advancement; Training Objectives; *Work Environment
IDENTIFIERS	*Australia; Deskilling; Empowerment

ABSTRACT

This publication is part of the study materials for the distance education course, The Changing Workplace: Part B, in the Open Campus Program at Deakin University. The first part of the document constructs a framework for exploring the concept of the workplace as a learning environment that is in fact the primary school for adult learning and development. The following topics are discussed: the educative function of work and the work environment; work as curricular structure (the rise of the Taylorist curriculum for work, Braverman and the deskilling controversy, and three approaches to work in postindustrial society); and work as a context for adult development and learning (work and personality formation and creating the educative workplace). The bibliography contains 108 references. The following papers constitute approximately 50% of the document: "Scientific Management" (H. Braverman); "On the Degradation of Skills" (W. Form); "Dilemmas of Transformation in the Age of the Smart Machine" (S. Zuboff); and "Learning, Empowerment and Participative Work Processes: The Educative Work Environment" (H. Kornbluh, R. Greene). The document contains a 10-item annotated bibliography. (MN)

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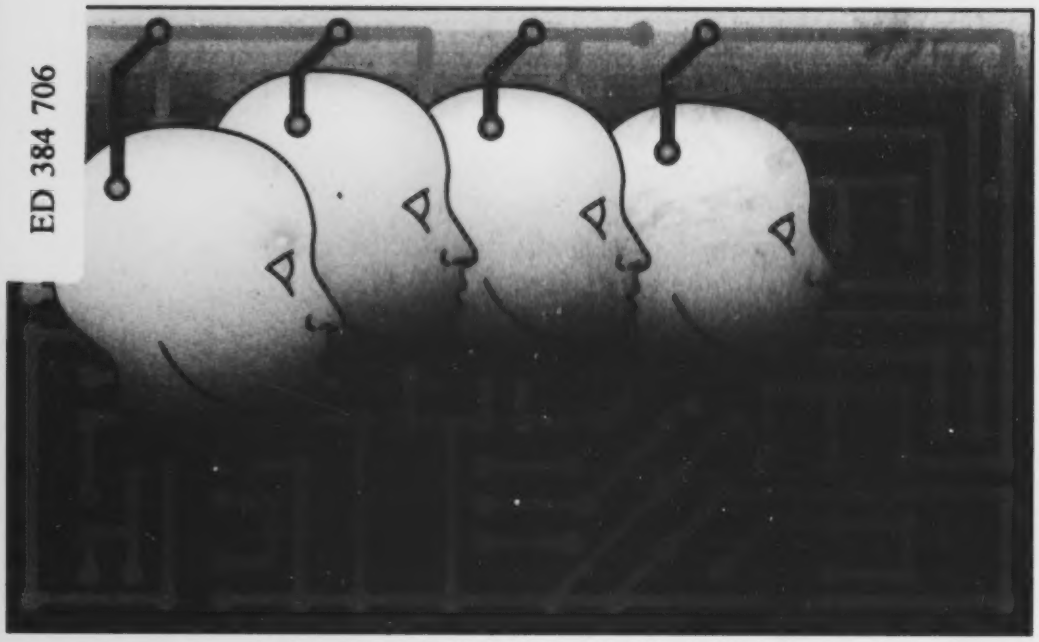

TOWARD DEVELOPMENT WORK: THE WORKPLACE AS A LEARNING ENVIRONMENT

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MICHAEL WELTON

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EEE701 ADULTS LEARNING: THE CHANGING WORKPLACE B

TOWARD DEVELOPMENT WORK: THE WORKPLACE AS A LEARNING ENVIRONMENT

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These books may be purchased from Deakin University Press, Deakin University, Geelong, Victoria, Australia 3217
More titles may be added to this list from time to time.
Enrolled students also receive a unit guide and supplementary material.

Published by Deakin University, Geelong, Victoria, Australia 3217
Distributed by Deakin University Press
First published 1991

© Deakin University 1991

Edited and designed by Deakin University Book Production Unit
Printed by Deakin University Printery

National Library of Australia
Cataloguing-in-publication data

Welton, Michael Robert, 1942–
Toward development work : the workplace as a learning environment.

Bibliography.
ISBN 0 7300 1354 5.

1. Employees — Training of. 2. Adult education. I. Deakin University. Faculty of Education. Open Campus Program. II. Title.

658.3124

This course was produced in part with developmental funding from the Victorian Education Foundation.

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SERIES INTRODUCTION

The nature and purpose of education in the workplace has been the subject of much debate in Australia in recent years. While the vagaries of local and international competition have led many firms to reconsider the role of their workforce and the training requirements this entails, governments have been equally keen to adapt existing education systems to the perceived needs of industry. Leading union bodies have been distinguished in this debate by their pro-active role, outlining the path by which a reconstructed industrial climate can win the nation a new place in the world economy.

The series of monographs of which this volume is a part explores the approaches to learning currently modeled within industry. In the process the question inevitably arises as to whether existing orientations and practices are in the best interests of the various stakeholders in the workplace.

The arguments developed in these monographs address themselves to a range of contemporary issues in industrial education. To date, prevailing approaches have rested upon narrow, instrumentalist notions of learning; in their different ways, the writers have set out to challenge this orthodoxy. In doing so, they highlight the silences—on questions of gender, class or ethnicity—that underpin the behavourist outlook still dominant in the world of training.

In preparing this series of monographs, the course team has sought to address issues that are of fundamental concern to those involved in the complex and demanding field of workplace learning. It is hoped that, in its own modest way, the pedagogy we have developed can serve to exemplify a different notion of what industrial education might become.

TOWARD DEVELOPMENT WORK: THE WORKPLACE AS A LEARNING ENVIRONMENT

Introduction

Perhaps nothing divides contemporary philosophers, historians, feminists, social scientists, postindustrial utopians and educators more deeply than how to assess the current reorganisation, meaning and developmental potential of work for men and women. As we rush uneasily into the high technology future of cybernetic capitalism, theorists from disparate disciplines and divergent vantage points are trying to gain an accurate seismographic reading of the reverberations within late capitalism. To what extent do these changes pose further threats to the decent and humane conduct of life? This exploratory survey sweeps over the territory of work past and present from a particular perspective. My animating assumption is that work is the primary school for adult learning and development. From this Archimedean point, we construct a framework that, one hopes, enables us to weave diverse strands into a coherent tableau: the workplace as a complex learning environment.

Proposing the constructive heresy

Some thinkers, echoing the ancient Hebraic lament of work as curse or the Aristotelian denigration of work as debasing, read the signs negatively:

1 high technology, postindustrial capitalism restricts the realm of freedom;

2 the organisation of work tasks and relationships deepens managerial control over work and degrades the skill content of work itself; therefore

3 the sphere of work cannot be viewed, philosophically or empirically, as an institutional context for adult developmental learning and socialisation, a sphere for self-realisation; consequently

4 the primary site for the development of human efficacy lies outside the workplace in

   (a) the political arena, where adults can be active, participatory citizens and

   (b) in the sphere of leisure activities; or

5 the 'iron cage' of the totally administered society has closed off any possibility for the expansion of human freedom in work, leisure or politics.

Those who resist this pessimistic reading of our contemporary scientific and technological culture and current dilemmas in the workplace echo

the human longing, present at least since the Renaissance and given history-making form during the Reformation, that work is an honorable calling, the sphere of aesthetic self-creation. And thinkers as diverse as Rousseau, Mill, Owen, Marx, Gramsci and Cole have argued that work is the central learning domain and sphere for the development of human capacity (Pateman 1970, 1989; Anthony 1977; Mason 1982; Dahl 1985; Gould 1988). There is, they contend, an 'interrelationship between the authority structure of institutions and the psychological qualities and attitudes of individuals' (Pateman 1970, p. 27). Work has a profound educative function for human beings, and is the fundamental 'training site' for a participatory democratic society. Competencies acquired in the primary school of adult learning spill over into other spheres of life. Workplace efficacy is linked to efficacy in all other areas of human activity (Mason 1982; Greenberg 1986).

The *educative function* of work is a neglected theme within both social and educational theory. In educational theory, we have thought about the relationship of education and work. We have recognised the structure-forming power of work organisation for the design of school-based curricula and learning processes. One recalls that early twentieth-century American curriculum theorists (e.g. Bobbit, Charters) attempted to apply Taylorist principles of scientific management to curricular organisation and the way the 'cult of efficiency' swept educational administrators off their feet (Callahan 1962; Tyack 1976). But we have not often thought of the organisation of work itself in curricular terms (Pipan 1989; Schurman 1989), or as a learning environment in its own right (Leymann & Kornbluh 1989). There are, however, several exceptions.

Alarmed at the growing division of labour and the fragmentation of the work process in the early twentieth century, John Dewey launched a two-pronged attack. He linked the struggle of workers for industrial democracy to the reform of the school. He thought that enhancing the scope for activity and developing co-operative social relations in school would support struggles to democratise the workplace (Wirth 1983). Later in the twentieth century, historian Lawrence Cremin expanded the notion of curriculum to include the workplace as the central structure-forming and value-engendering learning environment (1980, 1988). Both Dewey and Cremin are exceptional in inverting the conventional way educational theorists think about work, learning and education. They claim that the systemic imperative driving work organisation has more educative power than the weaker sphere of the school. This is not to deny that studies of socialisation *for* work are unimportant; our emphasis in this monograph falls on the understudied domain of socialisation *at* work.

Envisioning the workplace as a complex learning environment confronts us with many conceptual questions and practical issues. While no consensus has emerged from the voluminous literature on work, we can

identify thematic convergences and intersections. The German philosopher and social theorist Jurgen Habermas has consistently maintained in his provocative writings that work is one of the generic learning domains of the human species. His writings have impelled those working in the critical theoretical tradition to think imaginatively about the developmental possibilities of the workplace. Within contemporary Marxist scholarship, the themes of alienated labour and technical change still retain their analytical power. Empirical–analytical social psychological studies of the effect of work on personality formation have revealed insights about the decisive socialising role of work organisation (the interconnections between work, family life, mental health, political engagement and cultural expression). These insights intersect with those emerging from the numerous experiments of job redesign and worker participation. Nor can one neglect the contributions of the 'human relations' school. Inspired by the thought of Kurt Lewin and Abraham Maslow, thinker-activists like Chris Argyris and Donald Schön have carried the self-actualisation perspective, ambivalently to be sure, into the realm of organisation theory. In the realm of learning theory, both the European cognitive psychology and critical developments within popular adult education movements have emphasised that human beings are active, reflective creatures who learn to be helpless when they are forced to adapt to structures that block either scope for their imagination or action.

These developments, mentioned summarily, have led Robert Kahn and Bertil Gardell to propose a 'constructive heresy'. They argue that:

> concepts of learning can be plausibly applied to workplaces, and the doctrine that workplaces should be evaluated, at least in part, by the extent to which they enable workers to acquire and enhance valued skills and abilities. (Kahn & Gardell 1989, p. xi)

We can hypothesise that the 'use of learning paradigms and the application of educational criteria for the evaluation of work settings' (Kahn & Gardell 1989, p. xi) is a new paradigm that moves beyond conventional ideas about the education and training *of* workers to an analysis of the workplace as a 'cultural environment which has been selected as a set of possibilities for learning transactions' (Pipan 1989, p. 162). 'Taylorism', for example, would be understood as a learning theory in itself—a way of designing workplace organisation (in various settings) premised upon assumptions about human capacity to develop and learn.

In order to explore these issues in sufficient detail, this monograph will have two sections: 'Work as curricular structure: From Taylorism to cybernetic capitalism' and 'Work as context for adult development and learning'. In Section 1, our historical sketch of the evolution of work design will test the hypothesis that work organisation can be fruitfully viewed as

a curricular structure. Section 2 synthesises the main ideas about work and learning, and has a decidedly normative orientation. In Section 2 we will also examine what we know about how workplaces can become learner centered and developmental. Throughout, we will try to pose the key questions emerging from theory and practice that we ought to be considering in our educational practice as industrial training officers, human resource development specialists, community empowerment workers, job skills trainers or management consultants. At the outset, we must recognise that many studies of work and learning are gender blind (Phillips & Taylor 1980; Feldberg 1984; Knights & Willmott 1986; Jackson 1987). Other monographs in this unit explore in depth the gendered nature of work. Our tactic, rather, will be to signal central issues that gender-sensitive adult educators must take seriously.

SECTION 1

WORK AS CURRICULAR STRUCTURE: FROM TAYLORISM TO CYBERNETIC CAPITALISM

Historians, like bloodhounds, sniff close to the ground. They pay great attention to detail, the particular case, the exception, the diversity of human experience. They are reluctant to generalise. This is an important counterweight to the social scientist's search for laws governing the human condition, the evolution of modernity or the labour process. Labour historians are no exception; nonetheless, their patient scholarly work over the last couple of decades delineates a general pattern within the capitalist organisation of work. As Larry Hirschhorn observes, 'industrialization is a transcultural process that shapes social life in the same mold everywhere' (1984, p. 15).

The rise of the Taylorist curriculum for work

With the rise of early industrial capitalism (from roughly 1840 to 1890 in Canada), labour historians inform us, jobs began to change and work was reorganised. The industrialisation process itself required men and women to learn profoundly new modes of self and world understanding and acquire new skills, attitudes and sensibilities. The fundamental educative process at work in mid-nineteenth-century Canada was the 'transformation of Canadians' (remaking of the labour force) into industrialised minds and bodies. This process, H. Clare Pentland has observed, was conducted 'largely in the school of experience with the goad of harsh impersonal penalties for failures' (1981, p. 176). In the brutalising school of labour (the primary pedagogue according to Marx) workers were learning about the nature of mechanistic time, waged work, contractors, where their security and power lay, and the rules of the game in a capitalist market. In their families, churches, associations and libraries, working-class people re-

ceived their secondary education, reflecting on the meaning of the formative deep structural process reshaping the configuration of work and social life. During this period, Mechanics' Institutes sprang up everywhere in the industrialised world as the emergent bourgeois class transformed its way of understanding the world and organising production and imposed its cultural hegemony on the subordinate classes. Increasingly, workers came to rely on wages as sole income, the workplace was gradually separated from the household and the gender division of labour more incisively demarcated.

During this first phase of industrialisation, the rationalisation of work proceeds unevenly. Entrepreneurs are in the initial stages of assembling the work force, instilling within it the appropriate discipline, attempting to cheapen production costs by subdividing labour into lower paid, less skilled fragments and mechanising wherever possible (Heron & Storey 1986, p. 11). In the main, owners of enterprises exercised simple, direct control over the production process and were dependent on the workers' knowledge and skill (their cumulative learning embodied in craft). But managers were making initial attempts to 'subdivide labour into lower-paid, less skilled fragments ...' (Heron & Storey 1986, p. 11). During the mid- to late nineteenth century, the main locus of *resistance* to the reorganisation of work was the skilled craftsman. Absorbed in their tools, proud of their masculine traditions, their sense of self bound up with the tool's shape, power and limitations, craftsmen most frequently contested the emerging work relationships. They were in conflict with their overseers over the *meaning* of knowledge and skill and whether the organisation of work ought to permit scope for self-expression and the creation of cooperative work communities (Sabel & Zeitlin 1985; Block 1990, ch. 4). They fiercely resisted the undermining of their cumulated learning, often defending exclusivist craft against more general working-class interests and the inclusion of women into their particular industries.

Phillips and Taylor (1980) argue that confrontations over deskilling play out on an 'already sexually defined terrain' (p. 86). Background assumptions about the cultural meaning of women's work (what women do, no matter how deep and broad their knowledge and skill *really* is, is by definition unskilled) and male desire to retain a privileged edge within the sexual hierarchy have often led male craft workers to defend their craft interest against the opening-up of developmental possibilities for women (Cockburn 1983; Knights & Willmott 1986; Milkman 1987). Craft workers in the past and present have often affirmed their masculine solidarity by blocking women's access to resources (knowledge and skill) and demarcating particular forms of work as female. Sex segregation of work in general and in particular work sites is deeply rooted and very resistant to change

(Reskin & Hartmann 1986; Milkman 1987). Craftsmen were, therefore, enclosed within a limited view of the production process, and their specialised craft knowledge inhibited a more inclusive view of societal evolution and the development of their own and other's capacities. Still, the 'cooperative impulse' present within class and gender-constituted crafts, as Sabel and Zeitlin (1985) insist, is worth retrieving and remembering as we grapple with the confusion and agony of our transition to a postindustrial society.

It is not until the period between the late nineteenth century and the beginning of World War 2 (a period when *massive mechanisation* transformed almost every industry) that we see the lineaments of decisively modern work conditions. As capitalism entered its 'monopolistic' or 'corporate' phase (the age of conglomerates, cartels, administrative efficiency, advertising agencies, Taylorism, professionalisation and labour unrest) the labour process was radically reshaped by:

1 widespread mechanisation, incorporating scientific research in the solving of production problems (the scientisation of labour);
2 the subdivision of labour (the deskilling thesis);
3 the emergence of more centralised, efficient, authoritarian managerial systems (the bureaucratic control theme); and
4 professionalisation (the elite expert appears in many areas of social life).

Within the work literature, these interconnected processes have come to be coded as Taylorism, after Frederick Winslow Taylor, the obsessed and driven architect of the principles of scientific management (see Andrew (1981) for an illuminating biographical sketch).

Harry Braverman (1974) is the most influential expositor of Taylorism (reified into a set of general organisational principles) in contemporary social theory. His book has been the touchstone for historical studies and assessments of work in many different sites. Theorists remain divided over Braverman's depiction of the general tendency of the organisation of the labour process and assessment of the various attempts (job enrichment, job enlargement, human relations, semi-autonomous work groups, etc.) to humanise the workplace. Before considering the controversies, we turn to Braverman's thesis.

Braverman argues that the twentieth-century capitalist organisation of work inexorably breaks down job content into simple, monotonous, strictly controlled and narrowly specialised work phases which to a very high degree are lacking in demands on:

1 professional skill;
2 mental activity; and
3 judgment on the part of the worker.

Braverman observes:

> The unity of thought and action, conception and execution, hand and mind, which capitalism threatened from its beginnings, is now attacked by a systematic dissolution employing all the resources of science and the various engineering disciplines based upon it. The subjective factor of the labour process is removed to a place among its inanimate objective factors. To the materials and instruments of production are added a 'labour force,' another 'factor of production,' and the process is henceforth carried on by management as the sole subjective element. This is the ideal toward which management tends, and in pursuit of which it uses and shapes every productive innovation furnished by science. (Braverman 1974, pp. 171–2)

Numerous studies in industrial sociology corroborate the drift toward the 'expropriation of worker skills, experience and knowledge' by management. E. Hildebrandt, writing in a Bravermanian vein, observes that:

> self-initiative, creative thinking, the capacity for making decisions and social responsibility become not only superfluous as primary human attributes, but suppressed as dysfunctional. Little by little, the production process forces the dependent wage-earners to surrender their occupational and social competence, their shaping of their own work, as well as their own ideas about concrete labour. (Hildebrandt cited in Offe 1985a, p. 328)

The classic idea of work as an honourable calling becomes work as instrumental activity without power to 'confer dignity or direction on a human life' (Unger 1987, p. 27). If Braverman is correct, then the logic of the capitalist organisation of production (the systematic undermining of human capacity to exercise cognitive, communicative, affective and somatic abilities) challenges directly the achievement of a developmental, learner-centred, participatory democracy.

According to Braverman, deskilling (or dequalification) (Alvesson 1987) is the 'tendential' force reconstituting the capitalist labour process. The central organising principle of the Taylorist curricular structure is the radical separation of thinking from doing. Taylor (an imaginative engineer who had extensive shopfloor experience) announced his first principle in *The Principles of Scientific Management* (1912):

> the deliberate gathering in on the part of those on the management's side of all of the great mass of traditional knowledge, which in the past has been in the heads of the workmen, and in the physical skill and the knack of the workmen ... (Taylor cited in Andrew 1981, pp. 77–8)

Scientific managers undergo their own intensive educative process as they learn how to usurp workers' knowledge and take the initiative in designing *methods* of production. The workers, Taylor thought, could not comprehend the 'scientific laws' inherent in their jobs; they are transformed into *objects* of managerial action. Tools are standardised and the 'markings of craftsmanship' removed from the workers; class solidarity is reduced as piece rates and a premium system of payment replaces the standardised day rate; the opportunity for workers to organise their working lives, choose their working teams and production procedures and exercise leadership during work is eliminated (see Andrew 1981, pp. 86 ff). Within the Taylorised workplace, where the jobs of the shopfloor worker are simplifed, learning opportunities are reduced. The deskilling of the skilled shopfloor worker, however, accelerates the growth of white-collar jobs (in management, clerical work, stock-room and inventory jobs and lower administrative positions). This *instrumental paradigm* for workplace learning (Marsick 1987) assumes that (most) workers have a *limited capacity* to learn and that self-realisation cannot occur in the realm of production. Higher wages are adequate compensation for loss of control. F.W. Taylor's infamous worker, the pig-iron loader Schmidt, stands forever as a symbol of the guiding premise of the most powerful learning theory in the twentieth century—namely, that most people are rather stupid. The generic learning domain of work, for Braverman, remains captive to what Habermas has labelled 'purposive-rationality' (action oriented to the control of things and people). The ancient lament of work as curse is given a distinctive modern form.

Braverman and the deskilling controversy

At first glance, Braverman's thesis is compelling. It does seem to capture the central tendencies within workplace organisation in the twentieth century, and resonate with contemporary disenchantment regarding the technological imagination. His thesis, however, lacks complexity, irony, nuance, feel for contradiction and possibility. Labour historians, who are interested in Taylor's 'actual impact', argue that deskilling was not a smoothly executed, straightforward process. They contest Braverman's view of the process of change as the consolidation of 'untramelled capitalist power ... a once-and-for-all victory over working class autonomy on the shop floor' (Heron & Storey 1986, p. 28). Taylor's initial attempts to implement his principles at Bethlehem Steel were resisted by management and the working class. It was not until World War 1, when:

> restriction of output and class warfare were considered treasonable, when numerous efficiency experts flocked from private enterprise to

> government service and the provisos on government appropriations were overlooked, when hitherto untrained women who lacked the know-how and solidarity required to resist the speed-up methods were trained by Taylorites, did scientific management get widely practiced. (Andrew 1981, p. 72)

Throughout the period of massive mechanisation, workers continue the struggle with their employers over the definition and control of skilled work. They retain substantial informal power and autonomy on the job and find imaginative ways to maintain some leverage. The struggle for control of shopfloor knowledge is not a zero-sum game.

The political struggle to define skills and retain hard-won status and wage levels is only one component of an adequate conceptualisation of skill. Once we move beyond the definition of skill as the amount of time the average person takes to become expert in a particular job (Dreyfus & Dreyfus 1986) and deskilling as the deprivation of power to use original skills (Cockburn 1983), we confront a cluster of complex issues. Conflicting emphases abound in the literature on skill, deskilling and reskilling. The main reason for this, Block (1990) has observed, is that contradictory trends in different occupations co-exist and even the same occupation are 'subject to contradictory patterns at different work sites' (p. 85) (cf. Milkman's study (1987) of the automobile and electrical industries). If one wants, for whatever reason, to find deskilling, one can surely discover it. An adequate analysis of the concept of skill must, therefore, be constructed on two premises.

For one thing, when work is reorganised one skill dimension of a job may be upgraded and another downgraded. If we focus only on the way, for instance, factory automation reduces the number of relatively low-skilled operatives, we may miss seeing that the 'growing complexity of the technologies that need to be repaired creates a powerful countertendency' to deskilling (Block 1990, p. 94). Several case studies in Wood (1982) point to the emergence of a sectionalised rather than a deskilled, homogenous working class. Penn's study of the hierarchical development of the British engineering and cotton industries contests the notion that increased technological development produces decreased skill in a unilinear fashion. He pinpoints two kinds of labour processes in the engineering industry:

1 deskilled work, involving lathes set up for specific purposes and operated by nonskilled machinists; and
2 skilled work, demanding the constant changing of the lathes to perform a series of differentiated tasks by skilled crafts workers.

Nichols and Beynon's study (1977) of a chemicals complex exposes the 'complex and differentiated character of deskilled labour'. Heavy manual

labour persists in the shadow of highly capital-intensive industry; job hierarchies do develop, associated with specific productive processes, but engineering assumes growing importance, demanding active vigilance, increased responsibility and initiative (Wood 1982, pp. 48–9).

Block's careful analysis of the impact of automation on craft and in the office indicates that, at least in the current phase of 'flexible automation', the tendency is toward enhancing skill breadth (1990, p. 95; cf. Noble 1979). To be sure, as Zuboff (1988, chs 1&2) has argued, hands-on knowledge of production, often accumulated over long periods of time, can become obsolete. The tacit knowledge of the skilled machinist becomes 'less essential' to the production process. But the skill breadth (the range of different types of knowledge required to monitor and service new technologies) increases. Nonetheless, the increase in skill level, or breadth, may not lead irrevocably to increased job satisfaction. The application of new skills may accompany lengthy periods of tedium, and job satisfaction (as we shall see) cannot be limited to skill level. In sum, Block's survey of current literature indicates that flexible automation systems increase employee need for 'broad conceptual skills, including technicians and programmers' (1990, p. 103).

Second, an adequate concept of skill must comprehend that skill definitions are 'saturated with sexual bias' (Phillips & Taylor 1980, p. 79). From a developmental, learner-centred perspective, feminist scholarship has placed several important themes on the adult educator's agenda. Many feminists have argued that the classification of women's jobs as unskilled frequently is not synchronised with the actual amount of knowledge and skill required for their jobs—that is, they have pointed to the 'socially constructed' nature of skill. In Phillips and Taylor's words, 'skill is often an ideological category imposed on certain types of work by virtue of the sex and power of the workers who perform it' (1980, p. 79) (cf. Crompton & Jones 1984; Henwood 1987). Feminists also worry that the social and political processes of job redesign will not only lead to specific job losses for women, but will also lead to women's exclusion from 'technical knowledge and know-how' (Knights & Willmott 1986) (cf. Menzies 1981). They fear that the new technologies wil be masculinised, and women will be locked into low-skill jobs with no opportunity for either job enrichment or vertical career mobility. These concerns have led to impassioned calls for the transformation of pre-adult female socialisation (to counter the trend to steer girls away from science and technology) and for training initiatives for women (Gaskel & MacLaren 1987; Swarbick 1987).

Feminist concerns and postindustrial possibilities are poignantly manifest in clerical occupations. At least two factors complicate efforts to assess trends in the skill levels of clerical work. First, the managerial

impulse to reduce clerical workers' skill is present in workplace political struggles, and this deskilling impulse is interwoven with the patriarchal devaluing of the secretarial work performed by women. Managers and consultants devalue secretarial work because they are paid many times the salaries of the predominantly female secretaries. They have an interest in denying secretarial skill levels and, since the status of professionals varies directly with the status of their clients, female training efforts have been neglected (Westin 1985). Second, different stages in the automation process in offices must be recognised (Block 1990, p. 104). Initial stages of computerisation did, indeed, create large numbers of low-skilled data-entry jobs; and in the early phase of word processing firms commonly created word processing pools. More recently, the trend has shifted 'toward a more decentralized use of computers and word processing, with more positive consequences for clerical skills' (Block 1990, p. 104) (cf. Ginzberg, Novelle & Stanback 1986; Webster 1986).

Patterns in the banking and insurance sectors (which account for twenty per cent of all clerical employees in the US) disclose a 'dramatic shift' in the nature of clerical work. Baran's authoritative study of women in the insurance industry (1988) points to the emergence of highly computer-linked, multi-activity jobs that combine clerical and professional skills. Clerical work in insurance has been significantly upgraded. Similar patterns are evident in banking. Although clerical employment in banking has declined by thirty per cent (US figures), many employees now have increased responsibility. Paul Adler's study of French banking automation suggests that clerical staff need to develop a deeper 'conceptual understanding of what they are doing' (Block 1990, pp. 105–6). Yet, there is still serious resistance to the upgrading of clerical work in many firms. Feminist insistence on examining the patriarchal control of women's labour power is on target. Women clerical workers are often the lowest status group in an organisation, managers and trainers fear losing their own status if clerical workers' skill is recognised and rewarded and firms still use temporary centres of training. Numerous scholars have argued that office, or information, technology does not necessarily lead to deskilling (Davidson & Cooper 1987). Social policies outside and within workplaces play a central role in determining whether the new workplace will be developmental and learner centred for women.

Marx, the foremost nineteenth-century proponent of developmental work, argued that work ought to be 'free self-activity in which man forms, develops and appropriates his own capacities' (Markus 1983, p. 38). But under conditions of alienation, wage labour was a 'forced and externally imposed activity resulting in the increasing one-sidedness and deformation of its subject, the acting individual; it is therefore 'only the semblance of an activity ...' (Markus 1983, p. 38). With the emergence of the division of

labour, the *problem* for humankind becomes not so much deskilling (because our 'collective intelligence' increases through complex societal learning processes), but the exclusion of many individuals from the actual progress made in the spheres of science, technology, work organisation, art and culture. When the possibility of building a developmental culture is abandoned, despair etches itself into the collective psyche of contemporary life. We doubt that *any* progress has been made in learning about the objective world of nature, the intersubjective world of human interaction and our subjective understandings.

Three approaches to work in postindustrial society

As social theorists contemplate the *meaning* of this epochal shift to informational, cybernetic capitalism (symbolised in computers, robots and Silicon Valleys) they have offered divergent readings of the nature of work in our distempered times. This is not suprising. It is difficult to synthesise all the elements into a coherent picture. There are many contradictory tendencies present within our late capitalist world, and it is easy to render the particular into a universal pattern (Shaiken 1984; Agger 1985; Luke & White 1985). Three approaches to the organisation of work in our 'postindustrial' world emerge in the literature. The first approach maintains that Taylorism is still the prevalent curricular structure and deskilling the pre-eminent method for workplace design (Watkins 1986). The second approach claims that one can no longer talk of a 'basically unified type of rationality organizing and governing the whole of the work sphere' (Offe 1985a, p. 139). And the third approach, converging in part with the second, argues that 'post-industrial technology makes both Taylorism and its critique increasingly irrelevant' (Hirschhorn 1984, p. 66) and opens up possibilities for a developmental and learner-centered curricular structure (cf. Block 1990; Hirschhorn 1990). This latter theme has already been signalled in our discussion of the concept of skill.

In his monograph, Watkins (1986) sets out to debunk the myth that the new high technology industries will create future job opportunities. Watkins believes contemporary work designers and school-based planners are uncritically caught in the grip of a technological determinism that sweeps 'inexorably forward, generating change and a set pattern of historical development within its own autonomous entity' (Watkins 1986, p. 4). He asserts that human actors create technologies; technology cannot be 'separated from the whims and predilections of human beings' (p. 5).

To test his ideas, Watkins analyses the dominant centre of high technology industry (Zilog, Intel, Apple, Hewlett-Packard), Silicon Valley.

in California (which has influenced the Australian Industry Development Corporation to develop high technology industries). His *central argument* is that 'not all high tech industries operate completely with high tech occupations' (Watkins 1986, p. 17). Taylorist principles have been applied to the assembly process (e.g. printed circuit boards), and women and minorities are hired to perform repetitive, low-wage tasks. Watkins also points to the alarming practices of some high technology corporations, which shift their assembly line work to countries like Taiwan and Hong Kong. Like other work theorists (Rogers & Larsen 1984; Mitter 1986), Watkins observes that, within high technology companies, the labour market is segmented (elite technicians, managers and sales personnel perform creative conceptual work, unskilled workers who are often women and minorities are trapped within deadening, unskilled and often hazardous work). The deskilling process hits female workers the hardest. In banks, Watkins says, the introduction of computers and new information technologies has routinised white-collar office work. He thinks that 'increasing automation' has reduced secretarial skill and fragmented worker knowledge of banking processes. This process, Watkins concludes, is the dominant tendency in office work. But Watkins's analysis does not take into account the different phases of automation in offices, and contravenes empirical evidence that automation raises the average skill levels of manufacturing and clerical workers (Block 1990, p. 108).

His vision of the future of work is rather pessimistic. Essentially, Watkins thinks the myth that advanced technologies require a 'more highly credentialled and qualified workforce' (p. 23) obscures a bitter reality. In the future, most jobs will be in low technology, service Mac-jobs. He cites studies of the Australian tourist industry as an example (730,000 of 2.5 million new jobs by the turn of the century). Even if this is so, are these jobs *all* low-skill? Watkins thinks that serious misconceptions regarding high technology have lead us to believe 'that the introduction of high tech will result inevitably in an increasing number of jobs in new areas of work' (p. 25). This does not appear to be on the horizon of postindustrial society. The deindustrialisation process, he seems to be saying, propels a small elite into the postindustrial future, leaving in its wake the majority of workers, who are not yet discarded, labouring under Taylorised conditions. Watkins's analysis registers the profound ambivalence pervading contemporary thinking about whether a dualistic, polarised labour market has, in fact, emerged in Western capitalist societies (see Harrison & Bluestone 1988 for a discussion of the 'theory of the declining middle'). A full discussion of this issue is beyond the scope of this monograph, but critically alert adult educators should not accept easily arguments that suggest that the proportion of low-skill jobs has increased dramatically over the last two decades. Block, for one, has cited empirical evidence from the US that indicates that

the low-skill percentage of the labour force has remained at fourteen per cent from 1970 to 1987 (he admits that intermediate skill occupations have decreased in wages). In sum, the strength of Watkins's monograph lies in the demythologisation of the gilded promises of high technology. He has alerted us to the way the new technology *may* degrade worker skill and increase managerial surveillance and control (see Howard 1985 for some depressing examples). The picture Watkins paints of the world of work is, however, a partial one, and he does not see developmental possibilities inherent in the new technologies.

German social theorist Claus Offe's recent reflections (1985a) on the nature of work in late capitalist societies provide us with a more complete and complex picture than Watkins's Bravermanian new world. For those committed to developmental, learner-centred work, Offe's ideas are fascinating and provocative. He suggests that the notion, central to the classic tradition of bourgeois and Marxist sociology (Marx, Weber and Durkheim), that 'labour is the fundamental social fact' is now being radically questioned. Work *may* no longer be the central factor determining human identity. Leading contemporary thinkers such as Foucault, Habermas (ambivalently), Touraine, Gorz and Toffler no longer treat labour and the position of the worker in the productive process as the *chief organising* principle of social structures. The industrial form of rationality no longer heralds further social development. Offe wonders if this 'shift of interest' in contemporary social research (the 'antiproductivist' theme) really does reflect a decline in the sphere of production and work's capacity to determine the 'structure and development' of the larger society. Offe's answer is ambivalent.

Offe believes that we cannot assume that the organisation of work in our (partially) industrial, (partially) postindustrial society is internally coherent, able to be unified in terms of a technical, instrumental rationality. Work is vastly differentiated, diverse and heterogenous. The basic distinction which is required to make sense out of work in our time is the difference between 'productive' and 'service' forms of labour. To be sure, work in the secondary sector (the *locus_classicum* of Taylorism)—the production of industrial goods—falls under the abstract common denominator of technical–organisation and economic profitability. But, to comprehend the transformed nature of work in the 'post-industrial service society' (Bell 1956), we need a 'separate rationality of service labour' (Offe 1985b, p. 137). In the tertiary sectors, work has become more reflexive. The work of teaching, curing, planning, organising, negotiating, controlling, administering and counselling is not easily Taylorised. In fact, these 'people-producing' jobs require the learned skills of 'interactive competence, consciousness of responsibility, and acquired practical experience empathy' (Offe 1985b, p.138). Those working in the tertiary sector (e.g. nurses) do acquire techni-

cal (*formal, rational*) expertise as well as moral and practical understandings (normatively based, substantive rationality). These two rationalities (or learning axes) are dissimilar, and often clash. Certainly, this type of labour—education, therapy, social work, health education, policing, mass communications—is to some extent comprehensible as a *response* to problems generated in the industrial work sector. But this type of social labour is also:

> partially freed from the immediate discipline of an acquisitive social rationality, and from its corresponding achievement and productivity restraints ... the service labour of the 'new class' challenges and questions the work society and its criteria of rationality (achievement, productivity, growth) in favour of substantive, qualitative and 'humane' standards of value. (Offe 1985b, p. 139)

To what extent does the structural ambivalence of new class, service work generate the 'radical need' for developmental, learner-centred work? These workers are often in the forefront of the new social movements, and most critical of deskilling tendencies outside their own sectors (Offe 1985b).

Offe believes that the 'crisis of work society' is also reflected in the way men and women subjectively evaluate work. Sociologists like Ralf Dahrendorf think that work as an honourable calling (as necessary moral duty) has been decentred relative to other spheres of life. The 'convincing power of the idea of work as an ethical human duty' (Offe 1985b, p. 141) is disintegrating not only because of the secularisation of cultural traditions, but also because the rationalisation of industrial work has undermined 'producer's pride' (p. 142). He also offers the ingenious hypothesis that a highly developed welfare state tends to exclude increasing portions of social labour power from participating in the sphere of wage labour. As work recedes in its importance, people shift their quest for self-realisation to family, community, leisure activities or education. Although Offe doubts that work can be 'remoralised', he does note that the 'humanisation of work' movement is reinforced by people's 'growing sensitivity to the *social* and *ecological* costs of production ...' (Offe 1985b, p. 144). Offe sets out to challenge the idea that work can be thought of as an institutional context for human development. He ends up pointing to developmental possibilities within the new service sector, and opens the door for critical reflection and transformative action within other work sectors.

We can now add another piece of the jigsaw puzzle of contemporary society. Larry Hirschhorn (1984) disputes both the utopian and dystopian images of high technology society. Hirschhorn argues that the 'new technology' of the cybernetic workplace presents 'new opportunities and problems for work design' (p. 4). He insists that we not simply see 'quinessential twentieth century industry' (e.g. petrochemical production)

as an extension of Taylorist principles. Cybernetics, he argues, is based on the principles of 'integration and flexibility', and utopian dreams to the contrary, flawed human beings cannot create the perfect, self-regulating machine.

> The principle of flexibility, creates a conception of work in which the worker's capacity to learn, to adapt, and to regulate the evolving controls becomes central to the machine system's developmental potential. (Hirschhorn 1984, p. 58)

These new technologies engender a tension between learning and control; this is presently evident in the politics of work curricular design.

During the heyday of the scientific management movement, management had tried to limit the 'knowledge and planning competence of shop floor workers' (Hirschhorn 1984, p. 58). Seen in historical perspective, Taylorism was part of the growth of large-scale industry based on national markets, long-term investments and cost accounting. Hirschhorn's main criticism of Taylorism is that the:

> theoretical opposition to Taylorism cannot provide a practical alternative, nor can it provide the basis for a reconception of work in a postindustrial framework. Indeed, postindustrial technology makes both Taylorism and its critique increasingly irrelevant. (Hirschhorn 1984, p. 66)

Consider the worker's role in an automated steel mill. Workers can now view the 'mill as an integrated industrial process' (Hirschhorn 1984, p. 68). These continuous flow, integrated systems place new, more complex *cognitive demands* on workers—that is, their 'attention mechanisms and fine perceptual-motor skills depend upon timing and responsiveness ... and new styles of information processing' (Hirschhorn 1984, p. 68). Cybernetic systems are not simply amplified Taylorism! At least in these industries work becomes watching and attending as feedback-based controls are inserted everywhere—it can no longer be a question of the 'separation of execution from conception', but of *meaning* and *identification*. Whereas mechanisation narrowed skill and coerced workers to 'commit their bodies, if not their minds, to the machine process' (Hirschhorn 1984, p. 71), workers now become (potentially) more responsible for the entire process. Preparation and learning emerge as 'core elements' (p. 73) of work. We have already pointed to similar developmental tendencies in the automation of office work.

A new curricular model contesting the instrumentalist Taylorist approach breaks through the limits of industrial technological evolution. With the evolution of cybernetic sociotechnical systems, workers are forced (so to speak) by these new settings to develop diagnostic skills—the ability

to frame problems, infer causes from symptoms and check resulting hypotheses against one's analytic knowledge. To achieve new levels of 'conceptual flexibility', workers must integrate 'fringe awareness' and 'selective attention' into three modes of knowing: 'dense perception of physical processes, heuristic knowledge of production relationships, and theoretical understanding of the production process' (Hirschhorn 1984, p. 93). Their learning is not separate from acting and performing. This work demands a more inclusive view of the 'system as a whole, and a reevaluatation of old concepts in the light of new ones' (p. 95). The postindustrial 'control-room operator' brings his or her own awareness to consciousness. Workers, Hirschhorn claims, become more aware of their work environment, and begin to reflect self-consciously on their own actions. Developmental and learner-centred work becomes a real, concrete, historical possibility within these postindustrial settings.

Hirschhorn is not presenting us with a technological version of the 'greening of America'. The emergent new settings are, he thinks, innovative (and often fragmentary) responses to 'discontinuities in machine design, in worker-manager relationships, and in person-to-person relationships at work' (Hirschhorn 1984, p. 152). The new technology is demanding that we develop a:

> culture of learning, an appreciation of emergent phenomena, an understanding of tacit knowledge, a feeling for interpersonal processes, and an appreciation of our organizational design choices. (Hirschhorn 1984, p. 169)

But the constraints imposed by broader social forces and particular actors (management, unions) on the creation of developmental work and the identification of the enabling forces which reconstruct our workplaces must, however, be confronted. In his recent study, Hirschhorn (1990) drawns upon the pyschoanalytic categories of Melanie Klein to examine the unique forms of constraint that emerge within postindustrial workplaces. In these 'less forgiving and more demanding' (Hirschhorn 1990, p. 4) workplaces, many workers are engaging in 'socially defensive' actions that impair working relations with other employees. Hirschhorn sees socially defensive behaviour as a barrier to creating a developmental work culture. In Section 2 we target some of these constraints.

Our survey of work in the twentieth century has revealed conflicting visions about the developmental potential of work. The Bravermanian nightmare—that the logic of all work curricular design can be understood in terms of deskilling—has been the most influential conceptual framework for understanding work organisation. Braverman's major accomplishment has been to demythologise conventional notions about the progressive

upgrading of worker knowledge and skill in the twentieth century. For critically oriented educators, Braverman forced us to think about the *structural preconditions* for the achievement of a lifelong, just, learning society. However, historical case studies and contemporary sociological reflections indicate that his thesis is too unilinear and deterministic. From our perspective, worker *resistance* indicates that the instrumental curricular paradigm violates the generic human need for developmental work. To be sure, the most daunting philosophical question for work analysts, posed explicitly by Taylorism, is the extent to which the 'scientific' organisation of the labour force requires (at least at a particular stage in social evolution) the instrumental subjugation of labour. This theme has been the subject of Habermas's scholarly work (see Habermas 1970). Hirschhorn's analysis of postindustrial technology asserts that there is nothing inherent in technology per se that renders developmental work utopian. This orientation converges with that of the 'alternative technology' movement (Balbus 1982; Dickson 1974; Bookchin 1982), and Watkins's insistence that technology is not autonomous (Ellul 1964 is the classic statement of the 'autonomous technology' thesis). Offe's analysis of work adds two crucial dimensions to our discussion. His argument, that the logic of service work is governed by a different form of rationality from that in industry, undermines Braverman's thesis and points to developmental possibilities within this sector. And his discussion of the shift of locus of resistance to welfare state capitalist forms of oppression to actors outside the sphere of production has important implications for workplace (re)organisation. Resistance to the technocratic ideology dominating our lives today inevitably spills over into demands for the humanisation of the workplace—for all workers. The antiproductivist orientation of many new social movement activists also challenges the idea that work has its own inner meaning regardless of its final result. Can we really:

> find meaning and take interest in assembling televisions when the programmes are idiotic; or in making fragmentation bombs, throw-away fabrics or individual cars built for obsolesence and rapid wear and destined to sit in traffic jams? (Gorz 1976, p. 60)

Thus, our concept of developmental learning, in the last analysis, cannot be separated from the deepest questions regarding the humane organisation and conduct of our common life.

SECTION 2

WORK AS CONTEXT FOR ADULT DEVELOPMENT AND LEARNING

In this section we consider the ways social and educational theorists have envisioned the workplace as a complex learning environment. We will synthesise three interrelated literatures: studies of work and personality formation, the application of learning theories to the workplace, and job redesign studies. Our vantage point in this section, while drawing upon empirical studies, is normatively oriented. Do philosophical analyses of developmental work converge with empirical reality? Can a persuasive case be constructed for developmental work? Since the early 1960s, a spearhead minority in Australia, Europe and North America has been challenging the prevalent technocratic domination of work curricular design (Kelly 1982). Human relations specialists, organisational learning theorists, advocates of participatory democracy, sociotechnical experimenters and worker educators have all posed this question: Can the workplace become a site for the development of worker cognitive, communicative, affective and somatic capacities?

Work and personality formation

Carole Pateman (1970) presented a persuasive philosophical case for the *educative* effects of participation in industry and politics on human personality formation. Summing up the uninspired results of post-World War 2 political theory, Pateman claimed that democratic theory was no longer:

> centered on the participation of 'the people', on the participation of the ordinary man or the prime virtue of a democratic political system seen as the development of politically relevant and necessary qualities in the ordinary individual; in the contemporary theory of democracy it is the participation of the minority elite that is crucial and the non-participation of the apathetic, ordinary man lacking in the feeling of political efficacy, that is regarded as the main bulwark against instability. (Pateman 1970, p. 104)

She argued that political theory did not recognise the importance of the structure of authority in nongovernmental spheres for political socialisation and had abandoned the central concern of early democratic theorists. In the last fifteen years Pateman's vision of developmental democracy has been elaborated upon by such thinkers as Macpherson (1977), Dahl (1985), Elster (1989) and Gould (1988). And Pateman herself has integrated feminist analyses into her developmental conception of work and citizenship (1989).

Pateman discovered a repressed subtext within the political thought of Rousseau, J.S. Mill and Cole. She argued that the 'central factor' in Rousseau's theory was an 'educative one ...' (1970, p. 24). Rousseau believed that it was necessary to set up situations that forced the individual to learn. His infamous remark—that human beings can be 'forced to be free'—has often been misunderstood. Pateman recasts this to mean that participation in decision making 'forcibly' educates its participants. Like the Canadian political theorist, Macpherson (1977), she discovers ideas worth reclaiming in J.S. Mill's reflections on government. Government, for Mill, was 'first and foremost educative in the broadest sense ...' (1970, p. 29). He insisted that the *qualities* developed by institutional forms were of prime importance for the future of democracy. She observes that Mill expanded his hypothesis about the educative effect of participation to a 'whole new area of social life—industry'. The necessary participative qualities (understandings and skills) could only be developed through the 'democratisation of authority structures in all political systems' (1970, p. 35). And Cole's focal axiom was that a 'servile system in industry inevitably reflects itself in political servility' (1970, p. 38) (cf. Greenberg 1986).

Pateman has never deviated from her early commitment to developmental democracy. She has, however, argued convincingly that until quite recently even radical or participatory theory has remained 'untouched by feminist argument' (1989, p. 1). Admitting feminist concerns about the government of women by men into political discourse, Pateman argues, highlights the 'paradoxes, contradictions and ironies' (1989, p. 4) of women's exclusion from the public world. Delegated to the private realm of domesticity, women's status as full citizens has always been ambivalent. She believes that 'full citizenship' is the 'prerogative of capitalist, employed and armed men' and calls for a revisioning of the meaning of 'independence', 'work' and 'welfare' (1989, p. 202). In her second thoughts on J.S. Mill's arguments about political development and education through participation, Pateman notes that Mill thought a 'family justly constituted' would be the 'real school of the virtues of freedom' (1989, p. 217). Pateman wonders how it is possible for wives and mothers, their energies and skills channelled into domestic life, to have the:

> opportunity to develop their capacities or learn what it means to be a democratic citizen? ... Mill's failure to question the apparently natural

> division of labour within the home means that his arguments for democratic citizens apply only to men. (Pateman 1989, p. 217)

She also thinks that 'women's speech is persistently and systematically invalidated' (1989, p. 219). Creating developmental families, workplaces and public life requires that 'men and women freely interact as equals' (1989, p. 220); it also requires the incorporation of the practical and theoretical insights gained by a women's movement whose members 'collectively educate themselves and gain independence through consciousness-raising, participatory decision-making and rotation of tasks and offices' (1989, p. 220). Adult educators ought to take seriously the 'educative and developmental consequences' (1989, p. 221) posed by women's consignment to the private realm and the repression of women's right to full dialogue partner status in all spheres of human interaction.

Pateman places the 'educative or socialisation aspect of the participatory theory of democracy' (1970, p. 83) at the heart of her theoretical project. She argues that:

> industry occupies a crucial position in the question of whether a participatory society is possible; industry, with its relationships of superiority and subordination, is the most 'political' of all areas in which ordinary individuals interact and the decisions taken there have a great effect on the rest of their lives. (Pateman 1970, pp. 83–4)

Participation in workplace communicative interaction is the training ground for participation in the wider political sphere. It is precisely the socialisation dimension of workplace learning that political theorists have not fully appreciated. To be sure, political socialisation theorists like Almond and Verba (1963) have been concerned with the development of political efficacy in adults and children. But the linkage between a participatory environment *for* adults' and children's political attitude formation has not been adequately drawn out.

She recognises the 'specific role' that socialisation within family and school plays in predisposing children and youth to believe that they do, or do not, have the resources for high-level participation in work organisation or politics (cf. Willis 1977; Westwood 1985). She challenges the 'persistence theory'—that childhood experiences hold the key to understanding adult political behaviour. Her main criticism of the persistence thesis is that the antiparticipatory nature of work organisation has the power to *nullify* even those 'general tendencies' toward participation nurtured by the middle-class family—if the 'later experiences of the individual do not work in the same direction' (Pateman 1970, pp. 108–9). Mason, who has been influenced by Pateman, argues that the family and school hardly provide training for participatory democracy (1982, pp. 81 ff). To the extent that these caretaker

institutions (the power relationship within the family and school is necessarily asymmetrical but there is no valid reason why power relations *should* be asymmetrical in the institutions of adult life) provide children and youth with the opportunity to gain control over their surroundings, they could nurture a participatory predisposition. These learning sites, however, are not primary training grounds for 'learning democracy'. Childhood, Mason says, does not prepare us for everything. In fact, our 'most durable learning' may occur gradually, or be triggered by epochal historical events or the agonising contradictions and struggles of our everyday lives. We are not static beings; the world keeps on moving; adults are seldom the same people politically that they were as children. Pateman and Mason maintain that the persistence thesis be replaced by a gradual learning model, which would make the spheres of adult socialisation central to human developmental possibilities. In other words, if the 'vital training ground' for learning democracy is absent from the institutions of adult life, particularly work and politics, whatever capacities children have developed will atrophy, disappear or deform. All children, whatever their class, gender or ethnic background, may find their sense of personal efficacy and competence atrophying or disappearing as their scope for action and imagination is limited by authoritarian and bureaucratic adult life. Even if middle- and upper-class youth retain their sense of personal efficacy, it can easily become forms of expert domination of others. And poor and working-class children may have their 'learned helplessness' reinforced as they suffer the often hidden injuries of subordinated classes.

For Pateman, then, the major function of participation is educative, and the main learning process is participation itself. Like Gould (1988) Pateman conceives of freedom as self-development. Freedom, she says, ought not to be conceived as the absence of constraint. Rather, freedom must include the institutional possibility of exercising one's capacities. If a democratic society is to exist, it is necessary for a participatory society to exist (a society where all 'political systems' have been democratised). Industry is the *most important* area because most individuals spend a great deal of their lifetime at work and the business of the workplace provides an education in the management of collective affairs difficult to parallel elsewhere. Therefore, if individuals are to exercise the maximum amount of control over their own lives and environment, the authority structures in these areas must be organised so that individuals can participate in decision making. The 'theory of participatory democracy stands or falls on two hypotheses: the educative function of participation, and the crucial role of industry ...' (1970, p. 44). Two decades later, Pateman would no doubt encourage us to be attentive to the formidable barriers women face in simply gaining the *right* to participate fully in industry and the office.

Does Pateman's philosophical argument converge with the empirical

studies on work and personality formation? The answer, making allowance for the theoretical caution of empirical social scientists, is decisive:

> contemporary working life creates widespread mental and social problems and exercises a negative influence on satisfaction with life for a large number of people, thereby harming the whole of society. (Alvesson 1987, p. 220)

Research in work psychology and sociology points to the significance of the quality of work content and opportunities for development of worker well-being (Blauner 1964; Kornhauser 1965; Gardell 1976, 1978; Kohn & Schooler 1978, 1982, 1983; Kalimo & Leppanen 1987; Volpert 1989; Hirschhorn 1990). Melvin Kohn (1969), a major force in American sociology of work studies, has argued that occupational position is the *central indicator* of personality development. In his empirical studies, he has been guided by the concept of 'occupational self-direction'. In his view, supportive supervision, substantive complexity of work with things, ideas and people and the necessity of self-reliance in work are the decisive variables determining worker well-being. The central thesis emerging from recent work sociology is that human learning and development is, above all, set in relation to *work content* (its level of qualification) and to the opportunities available to the worker to exercise some form of control over his or her life. Working conditions nurturing learning, development of competence and personality growth are the reverse of those assumed to imply the risk of learned helplessness (Lennerlof 1989, pp. 18, 25). Mauritz Skold, a Swedish workers' educator, underscores this recurrent theme. The primary motivation of human beings, he says, is:

> the need to explore and gain control over their surroundings; the play of children as well as much adult behaviour seems to be directed towards this purpose. (Skold 1989, p. 19)

Being helpless or passive or apathetic is something we learn. Workers have the capacity to develop 'dynamic knowledge' (the sort of knowledge that gives individuals a chance to change and develop not only themselves and their social and work situations, but also to change and improve productive processes and products). He maintains that any education or training program that is isolated from everyday learning will be ineffectual (cf. Hirschhorn, Gilmore & Newell 1989). From the developmental learning perspective, action that is not governed by the individual's own processes—the individual is not in control of the situation—tends to generate various pathologies. Frese (1978) found depressive conditions (low self-esteem) present mainly among people employed in jobs with *limited possibilities* of control.

One of the more interesting reflections on just why routinised work should have negative effects on workers' mental health is that of Volmerg (1979). He believes that the division of labour and monotony of tasks are reflected in the mental structure of the individual. Job actions continuously performed on the same object do not allow the worker to realise him or herself. Because his or her actions are not bringing about any observable change, the worker has no way of determining his or her place in time and space. The worker cannot identify with the object produced. He or she does not feel actively related as subject to the object; subject and object stand meaninglessly beside each other:

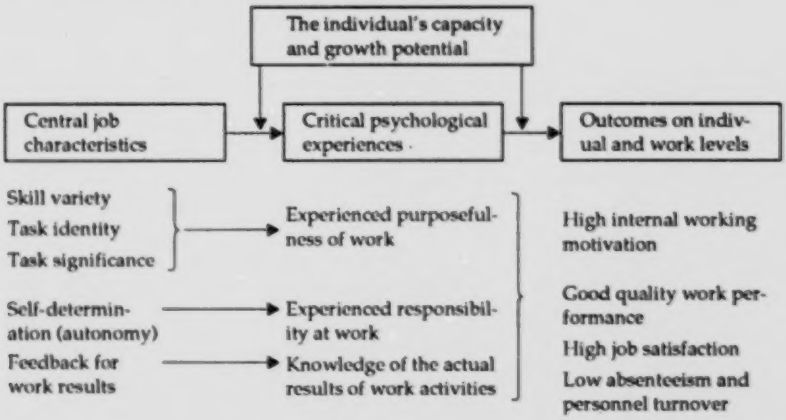
> The individual falls into a continuous state of apathetic indolence and emptiness. The meaninglessness and monotony of the job actions correspond to an emptying and unification of the senses. (Volmerg 1979, p. 44; translation by Michael Welton)

The emphasis on the central importance of occupational self-direction (the *content* of the work) for worker well-being represents an important shift in twentieth-century social scientific work literature. Classical human relations approaches (from Mayo's 'Hawthorne studies' of the 1930s (1977) to Maslow (1954) and McGregor (1960)) focused on 'good human relations' (or worker affective development) to the neglect of occupational self-direction. To be sure, the concern with 'understanding, communication and participation' (Bell 1956, p. 28) illuminated previously unnoticed dimensions of the work environment. However, the emphasis on worker security and rewarding human relations, while important, constructed the problem of worker motivation in overly psychologistic and individualistic terms. The self-actualisers tended to accept the ends of production as 'given', believing that workers could be psychologically adjusted to their jobs so that the 'human equation' matched the 'industrial equation' (Bell 1956, p. 25). Human relations theorists tend to identify self-actualisation with internal motivation, whereas critically oriented social theorists link self-direction with worker mastery and control of the work process itself. The management-oriented literature, perhaps not unexpectedly, tends to follow the human relations orientation. Managers have been more interested in motivation than job satisfaction or meaning: their concern has been to learn how to motivate workers to higher levels of productivity and internal satisfaction without transforming the technical system of organisation and the administrative control system. The presence of a servile industrial psychology since the rise of Taylorism (Hugo Muensterberg's *Psychology and Industrial Efficiency* appears in 1913) has led radical critics like Braverman to heap scorn on human relations experts as the 'maintenance crew for the human machinery' (1974, p. 87) and to be skeptical about any managerial

initiative to improve the quality of work life or increase worker participation (Munnelly 1987).

Hackman et al. (1975) provide us with a useful synthesis of the literature on job satisfaction and motivation.

Figure 1 Relationship among core job dimensions, critical psychological states and on-the-job encounters



Source: Adapted from B.M. Staw, *Psychological Foundations of Organizational Behavior*, Scott, Foresman, Glenview, Ill, 1977, p. 60.

Hackman and associates believe that five dimensions of work are of decisive importance to the creation of high job satisfaction and high internal motivation. The 'central job characteristics' of skill variety, task identity and significance affect purposefulness (work's meaning), worker autonomy influences 'feeling of responsibility' and feedback permits workers to *know* the actual effects of their work. These structurally induced psychological states, Hackman says, influence, in turn, work satisfaction, absenteeism and internal motivation. As Alvesson observes:

> Hackman et al. believe that a job which is to yield high motivation must score high on at least one, but perferably more, of the three dimensions which result in experienced purposefulness in work as well as on autonomy and feedback. (Alvesson 1987, p. 97)

This model moves beyond the human relations school by making job content the 'central dimension in the working situation'. It places 'extensive demands' on the transformation of the 'technical working conditions'—which give rise to purposefulness, experienced responsibility and knowledge of the results of work (Alvesson 1987, p. 97).

Creating the educative workplace

We are now positioned to focus on the 'possibility of changing work situations' (Leymann & Kornbluh 1989, p. 235). We will give particular attention to the essays of Kornbluh and Greene, and Leymann in Leymann & Kornbluh (1989). These essays synthesise current thinking on how 'concepts of learning can be plausibly applied to workplaces' (Kahn & Gardell 1989, p. xi). These matters are intricate and complex, and the 'educative workplace model' is offered as a modest proposal, a starting point for reflective practice. Our assumption is that this model is applicable to different work sites—state, industrial and service. We do, however, have to take seriously the particular set of problems and issues posed by hospitals or schools, banking or insurance offices as well as a host of commodity-producing settings. And it certainly needs to be recognised that any of the issues discussed (e.g. the importance of work groups) can be opened out and plumbed in depth. Finally, we need to acknowledge that the educative workplace model presses beyond individual-centered approaches to the education and training of employees—that is, the adult educator's task is to promote self-directed learning (Marsick 1987) (cf. Collins 1990, ch. 2) or critical thinking in its individual employees.

In 'Learning, empowerment and participative work processes: The educative work environment', Kornbluh and Greene, both of whom are seasoned worker educators, construct their argument on three propositions:

1 nonformal educational processes are potentially powerful tools for developing an educative work environment;
2 andragogical learning and empowerment theory can be adapted to the workplace; and
3 this learner-centred approach can help us to build worker learning possibilities into our organisational designs.

While not rejecting the importance of the usual formal education and training programs provided for workers, Kornbluh and Greene argue that truly meaningful learning can only occur if the workplace provides, in its everyday functioning, opportunities for all workers to develop their capacities.

> Their *guiding concept* is the 'educative work environment':
>
> the striving to maximise learning in the workplace through the way work, decision-making, technology and related processes are designed, maintained and redesigned. It includes the structuring and evaluating of work relationships based on their individual and mutual learning and knowledge-creation potential. (Kornbluh & Greene 1989, p. 258)

Only a work organisation which fosters such an environment, they say, can be described as an:

> organisation *that values individual and group learning as highly as any other aspect of the productive process*, that is as conscious of learning as it is 'cost conscious' or 'quality conscious'. (Kornbluh & Greene 1989, p. 258)

This frankly radical humanistic standpoint, Kornbluh and Greene think, is not hopelessly utopian. Scanning global experiments in organisational redesign, they discover (in Japan, Sweden and Norway) evidence that indicates organisations that build-in opportunities for workers to learn are more likely to succeed. They also think that mid-1970s work legislation in Sweden and Norway (The Swedish Industrial Democracy Law and the Norwegian Work Environment Law) represents a 'new direction in the continuing development of the work environment concept' (1989, p. 257). Creating a learner-centred, developmental workplace has broken partially into contemporary history; the old bureaucratic-Taylorist paradigm, however, refuses to disappear. Critically oriented educators have their work cut out for them: to intervene in workplaces to create the *enabling conditions* for developmental learning to occur.

The importance of nonformal learning has long been recognised within adult education theory and practice (Torres 1990). Kornbluh and Greene think that, for blue-collar workers especially, the opportunity to 'learn and grow in the work situation itself is extremely important given their frequently experienced lack of success in previous schooling situations' (p. 258) (cf. Rubenson 1983; Skold 1989). Nonformal education provides a framework for:

1. developing different ways to learn that are not based on a formal 'schooling' process that can discourage participation;

2. utilising what we know about the theory of how adults learn—in contrast to applying traditional 'pedagogic' theories to the adult learning process;

3. relying on learning through structures and processes in which work and work-related activities take place, and that do not require a large amount of formal education;

4. presenting a grounded understanding of theory, since it transforms concrete phenomena and experience into abstract knowledge that is immediately tried out and tested as new practice;

5. exposing and tapping everyday cognition in persons, and empowering them in areas of new application and direction;

6. developing knowledge in new or different ways through utilizing interrelationships of people at work;

> 7. helping to equalize learning and growth opportunities in workplaces where power, influence, and compensation are otherwise mainly distributed through a status, credential-based system. (Kornbluh & Greene 1989, pp. 258–9)

In sum, Kornbluh and Greene think that nonformal education processes involve three types of intertwined competencies:

1 *work* competencies;
2 *learning* competencies (increased ability to learn and be conscious of one's self as learner);
3 *influence* comptencies (ability to influence the work situation and a heightened consciousness of the increased possibilities for influence) (see p. 259).

This is an admirable adaptation of our understanding of nonformal education to the workplace.

Kornbluh and Greene survey the literature on participation, learning and empowerment to deepen their understanding of adult learning. Although they find little relating specifically to workplace learning, they glean insights and useful analyses to develop 'principles and practices of *workplace* learning' (1989, p. 259). Four central themes emerge from their review. People who move from 'learned helplessness' to 'empowered actors' must be enabled to:

1 unlearn their deference to authority and demystify those social and political processes negatively affecting their lives;
2 be nurtured in this process by an enabler (mentor, resource, friend);
3 exercise their new understanding and competencies in a 'spiral of increasing responsibility'; and
4 learn within a framework of interdependence and mutuality (see pp. 260–3).

The latter theme Kornbluh and Greene find especially significant for the work situation: structuring work in groups which assume responsibility for decisions about how they perform their work (Herbst 1974; Emery & Thorsrud 1976).

Kornbluh and Greene maintain that the achievement of an educative work environment requires starting points for the difficult journey. Unabasedly they suggest that the principles of adult learning form a 'set of guidelines' for organisational transformation. They draw upon Knowles's well-known andragogical principles (while rejecting his individualism), his emphasis on the *process* of learning and the teacher's role as *enabler* (Welton 1987; Collins 1990). Central to this enabling process, adult learning theorists have discovered, is the establishment of a collaborative and open

learning climate in which 'colearners' engage in dialogic planning processes. This orientation, they claim, harmonises with knowledge gained from industrial democracy experiments and studies of group dynamics (Jaques 1953; Trist 1985).

> Well-developed self-steering work groups and related work relationships, whether intentionally or not, carry through a process of learning that has the dynamic of empowering participants, developing 'learned influence' rather than 'learned helplessness...', and has a theoretical base in adult learning theory. (Kornbluh & Greene 1989, p. 265)

How do they apply this model to work organisations? They argue that principles of empowerment learning have profound implications for work organisations in four main areas. First, developing *enabling learning roles* within work organisations provides a fresh way of thinking about the roles of managers, supervisors, professionals, technicians and workers. Managers and supervisors are challenged to move beyond the bureaucratic-Taylorist control model to become leader/enablers. Transforming their 'supervisory function' would involve shifting as much responsibility for work and learning onto worker groups. Professionals and technicians would become resource people for workers. They would learn how to transmit and integrate what they know with what workers know. And workers would have to learn how to work effectively with resource people and rethink existing seniority and job classification systems. Second, developing the work organisation as a *learning milieu* requires that design processes provide learning opportunities. Third, *meaningful participatory processes* must be developed. Workplaces can be evaluated for the ways they incorporate principles of democratic decision-making. Workers ought to be included in 'reflective action'—they should not simply be doers (cf. Smyth 1986). Time devoted to discussion for work planning and problem-solvin, and opportunity to integrate reflection into job activities ought to be incorporated into work schedules. Workers can also learn to be coresearchers. Fourth, a *work climate* committed to learning ought to be created. Training for new roles and practice in a 'supporting atmosphere is essential for establishing a learning climate' (p. 268). The open sharing of information is the linchpin here:

> All knowledge that workers feel they need should be made available short of compromising the enterprise's competitiveness or real need for confidentiality. With the development of the profusion of monitors and computers in the work processes in most sectors of the economy, rapid and broad access to information is possible. All this acts to create a climate of continually raising the level of understanding and efficiency of the entire work force in relation to the whole work process. (Kornbluh & Greene 1989, p. 269)

Leymann's essay (1989) underscores Kornbluh and Greene's emphasis on the necessity of democratising the communicative infrastructure of organisations. Leymann challenges the 'myth of organizational learning'. In the 1960s, he says, group dynamics, sensitivity training and organisational development (the 'fruit of humanistic psychology') flourished. By the 1970s researchers and practitioners had clearly not succeeded in transforming the 'psychological climate' of the workplace—the power structure of corporations had not been altered. This led, Leymann believes, to the creation of the myth that, while individuals learned, the organisation did not. As Chris Argyris wrote:

> The inability to uncover errors and other unpleasant truths arises from faulty organizational learning. (Argyris 1977, p. 115)

Leymann thinks that conceptualising the organisation as an organism that evolves to 'maturity' obscures the fact that it is always 'people who behave, learn, defend themselves or are creative' (Leymann 1989, p. 287). Organisations should be understood as structures of action, communication and behaviour between people with *different degrees of power*. The organic metaphor can easily become an ideological mechanism to block organisational change (the organisation has not matured yet) and deflect criticism from asymmetrical power relations: Whose learning are we talking about?

Leymann finds empirical support for his argument in several job redesign experiments conducted by the Centre for Working Life in Sweden (Goranzon 1982; Sandberg 1984). Extrapolating from these experiments, Leymann identifies 'collective will formation' through 'open interaction' as the most significant factor in organisational change. The knowledge participants acquired in these experiments, Leymann states:

> altered their behaviour to one another; it changed ... the *communicative infrastructure* between people. It was not the organisation that learned something in these companies, it was people. Owing to the fact that they had *scope for action*, they were able to change a number of interpersonal structures, and this made it possible for them to benefit from the knowledge they had acquired. (Leymann 1989, p. 288)

People who have learned something new must have *'enough influence* or *autonomy* to change the communicative infrastructure of their workplace' (Leymann 1989, p. 288). Leymann's insights converge with the philosophically oriented work of Habermas (1984) who posits the ideal of noncoercive communication for democratic institutional life, Freire's (1970) positing of a dialogical mode of learning in contrast to authoritarian pedagogy, and Forester's (1989) learner-centred communicative model for planning in the face of power.

The socioeducative struggle for developmental, learner-centred work environments cannot, however, escape the intricate politics of workplace curricular design. For one thing, worker participation may disrupt the 'organisation of knowledge' within work organisations. As workers increase their responsibilities and develop new work competencies, they often become critical of the splitting of labour, planning and action. They may demand that these dimensions of the work process be built into all jobs. They may not want to do without knowing it. However, we should not underestimate the technocratic bias pervading our culture and organisational life (instrumental, antidialogic approaches to problem solving). Another hindrance to the 'learning-conscious organisation' is the careerism of managers, professionals and technicians. Their status and reward system is usually not linked to the development of a *real* participatory managerial style. In fact, they are often schooled to manipulate the language of democracy without transforming the power structure of the organisation. Adopting the language of human relations may well be a way of defusing resistance and opposition with the enterprise. Nor are engineers often trained to understand the human factors appropriate to technical design; they may be unwilling to even consider the role of group processes at work. Moreover, at the social policy level, appropriate legislation is often not in place to support a workplace climate for enabling learning. Collective bargaining legislation may itself be a barrier to the creation of the educative workplace (workers cannot bargain over job design and technological change) (Deutsch 1989).

Nonetheless, evidence from workplace life and academic reflection clearly indicates that workers have the capacity to manage themselves, and some engineers have proven they can work in multidisciplinary teams. The trend to reduce the number of managers also helps engineers, workers and managers to develop a 'culture of learning', or perhaps even a 'work community'. In sum, Kornbluh and Greene believe that worker involvement in job design is a necessary precondition for their empowerment. Involvement in design integrates the active and reflective components of human action. The relation between skilled professionals in the work force and unskilled workers is transformed, as professionals become resources for facilitating worker empowerment. Worker participation in design adds research, experiment, knowledge discovery and creation functions to jobs formerly involving the rote implementation of prepackaged instructions. Finally, all jobs require knowledge to becontinually updated.

Afterthoughts: Invitation to dialogue

Anyone who thinks about the meaning of work for human beings in our agonising world has to be struck by the unsettling coexistence of pessimistic and optimistic perspectives. Every positive assertion is negated by someone: utopian visions of technology as liberator countered by gloomy prognostications of an increasingly deskilled, degraded labour force; the very idea of the educative workplace greeted skeptically by educators humbled in the face of seemingly recalicitrant power structures and unimaginative administrators. The *central challenge* for adult educators, we have argued, is to develop a critical analytical and normative framework for understanding the constraints on and possibilities of developmental, learner-centred work. At the outset we argued for the analytical and practical viability of a learning perspective on work, and proposed that work organisation be viewed as a formative and value-engendering curricular structure. From there, we examined historical tendencies in the organisation of the capitalist labour process, and discovered that the Bravermanian deskilling thesis, while pointing to one important dimension of workplace reorganisation, was too one-sided. This led us to reflect on the meaning of skill, and conclude that gender and class dynamics account for its complexities and ambiguities.

An important thread running through historical and contemporary analyses of the deskilling debate, we discovered, was worker resistance to the degradation of their working life. And our brief survey of conflicting perspectives on the meaning of work in the transition to a postindustrial society revealed that, while some theorists may have abandoned the idea of good work, the current technological transformation of office and factory has opened up possibilities for developmental, learner-centred work. The empirical evidence from work and personality studies certainly suggests that good work is a normative need for human beings. Still, it does seem paradoxical that, even though we may know this, many workplaces continue to be antidevelopmental places to live. What are the constraining factors? Our discussion of the educative workplace is offered as a yardstick, informed by social theory and practice, to guide our collective efforts to build developmental work environments. The future reshaping and design of work, in the last analysis, has much to do with the understanding we have about what it means to live fully and freely in our emergent postindustrial world. If we decide that we cannot or will not struggle for developmental, learner-centred work, what alternatives will we offer?

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READINGS

1

SCIENTIFIC MANAGEMENT

H. BRAVERMEN

H. Braverman, *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*, Monthly Review Press, London, 1974, pp. 111–23.

Taylor set out to gather into management's hands all the basic information bearing on these processes. He began a series of experiments at the Midvale Steel Company, in the fall of 1880, which lasted twenty-six years, recording the results of between 30,000 and 50,000 tests, and cutting up more than 800,000 pounds of iron and steel on ten different machine tools reserved for his experimental use.* His greatest difficulty, he reported, was not testing the many variations, but holding eleven variables constant while altering the conditions of the twelfth. The data were systematized, correlated, and reduced to practical form in the shape of what he called a "slide rule" which would

* Friedmann so far forgets this enormous machine-shop project at one point that he says: "This failure to appreciate the psychological factors in work is at least partially explained by the nature of the jobs to which Taylor exclusively confined his observations: handlers of pig iron, shovel-laborers, and navvies." [27] He was led to this error by his marked tendency to side with the psychological and sociological schools of "human relations" and work adjustment which came after Taylor, and which he always attempts to counterpose to Taylorism, although, as we have pointed out, they operate on different levels. In general, Friedmann, with all his knowledge of work processes, suffers from a confusion of viewpoints, writing sometimes as a socialist concerned about the trends in capitalist work organization, but more often as though the various forms of capitalist management and personnel administration represent scrupulous efforts to find a universal answer to problems of work.

determine the optimum combination of choices for each step in the machining process.[28] His machinists thenceforth were required to work in accordance with instructions derived from these experimental data, rather than from their own knowledge, experience, or tradition. This was the Taylor approach in its first systematic application to a complex labor process. Since the principles upon which it is based are fundamental to all advanced work design or industrial engineering today, it is important to examine them in detail. And since Taylor has been virtually alone in giving clear expression to principles which are seldom now publicly acknowledged, it is best to examine them with the aid of Taylor's own forthright formulations.

First Principle

"The managers assume . . . the burden of gathering together all of the traditional knowledge which in the past has been possessed by the workmen and then of classifying, tabulating, and reducing this knowledge to rules, laws, and formulae. . . ." [29] We have seen the illustrations of this in the cases of the lathe machinist and the pig-iron handler. The great disparity between these activities, and the different orders of knowledge that may be collected about them, illustrate that for Taylor—as for managers today—no task is either so simple or so complex that it may not be studied with the object of collecting in the hands of management at least as much information as is known by the worker who performs it regularly, and very likely more. This brings to an end the situation in which "Employers derive their knowledge of how much of a given class of work can be done in a day from either their own experience, which has frequently grown hazy with age, from casual and unsystematic observation of their men, or at best from records which are kept, showing the quickest time in which each job has been done." [30] It enables management

to discover and enforce those speedier methods and shortcuts which workers themselves, in the practice of their trades or tasks, learn or improvise, and use at their own discretion only. Such an experimental approach also brings into being new methods such as can be devised only through the means of systematic study.

This first principle we may call the *dissociation of the labor process from the skills of the workers.* The labor process is to be rendered independent of craft, tradition, and the workers' knowledge. Henceforth it is to depend not at all upon the abilities of workers, but entirely upon the practices of management.

Second Principle

"All possible brain work should be removed from the shop and centered in the planning or laying-out department. . . ." [31] Since this is the key to scientific management, as Taylor well understood, he was especially emphatic on this point and it is important to examine the principle thoroughly.

In the human, as we have seen, the essential feature that makes for a labor capacity superior to that of the animal is the combination of execution with a conception of the thing to be done. But as human labor becomes a social rather than an individual phenomenon, it is possible—unlike in the instance of animals where the motive force, instinct, is inseparable from action—to divorce conception from execution. This dehumanization of the labor process, in which workers are reduced almost to the level of labor in its animal form, while purposeless and unthinkable in the case of the self-organized and self-motivated social labor of a community of producers, becomes crucial for the management of purchased labor. For if the workers' execution is guided by their own conception, it is not possible, as we have seen, to enforce upon them either the methodological efficiency or the working pace desired by

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capital. The capitalist therefore learns from the start to take advantage of this aspect of human labor power, and to break the unity of the labor process.

This should be called the principle of the *separation of conception from execution,* rather than by its more common name of the separation of mental and manual labor (even though it is similar to the latter, and in practice often identical). This is because mental labor, labor done primarily in the brain, is also subjected to the same principle of separation of conception from execution: mental labor is first separated from manual labor and, as we shall see, is then itself subdivided rigorously according to the same rule.

The first implication of this principle is that Taylor's "science of work" is never to be developed by the worker, always by management. This notion, apparently so "natural" and undebatable today, was in fact vigorously discussed in Taylor's day, a fact which shows how far we have traveled along the road of transforming all ideas about the labor process in less than a century, and how completely Taylor's hotly contested assumptions have entered into the conventional outlook within a short space of time. Taylor confronted this question—why must work be studied by the management and not by the worker himself; why not *scientific workmanship* rather than *scientific management*?—repeatedly, and employed all his ingenuity in devising answers to it, though not always with his customary frankness. In *The Principles of Scientific Management*, he pointed out that the "older system" of management

> makes it necessary for each workman to bear almost the entire responsibility for the general plan as well as for each detail of his work, and in many cases for his implements as well. In addition to this he must do all of the actual physical labor. The development of a science, on the other hand, involves the establishment of many rules, laws, and formulae which replace the judgment of the individual workman and which can be

effectively used only after having been systematically recorded, indexed, etc. The practical use of scientific data also calls for a room in which to keep the books, records, etc., and a desk for the planner to work at. Thus all of the planning which under the old system was done by the workman, as a result of his personal experience, must of necessity under the new system be done by the management in accordance with the laws of the science; because even if the workman was well suited to the development and use of scientific data, it would be physically impossible for him to work at his machine and at a desk at the same time. It is also clear that in most cases one type of man is needed to plan ahead and an entirely different type to execute the work.[32]

The objections having to do with physical arrangements in the workplace are clearly of little importance, and represent the deliberate exaggeration of obstacles which, while they may exist as inconveniences, are hardly insuperable. To refer to the "different type" of worker needed for each job is worse than disingenuous, since these "different types" hardly existed until the division of labor created them. As Taylor well understood, the possession of craft knowledge made the worker the best starting point for the development of the science of work; systematization often means, at least at the outset, the gathering of knowledge which *workers already possess.* But Taylor, secure in his obsession with the immense reasonableness of his proposed arrangement, did not stop at this point. In his testimony before the Special Committee of the House of Representatives, pressed and on the defensive, he brought forth still other arguments:

I want to make it clear, Mr. Chairman, that work of this kind undertaken by the management leads to the development of a science, while it is next to impossible for the workman to develop a science. There are many workmen who are intellectually just as capable of developing a science, who have plenty of brains, and are just as capable of developing a science as

> those on the managing side. But the science of doing work of any kind cannot be developed by the workman. Why? Because he has neither the time nor the money to do it. The development of the science of doing any kind of work always required the work of two men, one man who actually does the work which is to be studied and another man who observes closely the first man while he works and studies the time problems and the motion problems connected with this work. No workman has either the time or the money to burn in making experiments of this sort. If he is working for himself no one will pay him while he studies the motions of some one else. The management must and ought to pay for all such work. So that for the workman, the development of a science becomes impossible, not because the workman is not intellectually capable of developing it, but he has neither the time nor the money to do it and he realizes that this is a question for the management to handle.[33]

Taylor here argues that the systematic study of work and the fruits of this study belong to management for the very same reason that machines, factory buildings, etc., belong to them; that is, because it costs labor time to conduct such a study, and only the possessors of capital can afford labor time. The possessors of labor time cannot themselves afford to do anything with it but sell it for their means of subsistence. It is true that this is the rule in capitalist relations of production, and Taylor's use of the argument in this case shows with great clarity where the sway of capital leads: Not only is capital the property of the capitalist, but *labor itself has become part of capital.* Not only do the workers lose control over their instruments of production, but they must now lose control over their own labor and the manner of its performance. This control now falls to those who can "afford" to study it in order to know it better than the workers themselves know their own life activity.

But Taylor has not yet completed his argument: "Further-

more," he told the Committee, "if any workman were to find a new and quicker way of doing work, or if he were to develop a new method, you can see at once it becomes to his interest to keep that development to himself, not to teach the other workmen the quicker method. It is to his interest to do what workmen have done in all times, to keep their trade secrets for themselves and their friends. That is the old idea of trade secrets. The workman kept his knowledge to himself instead of developing a science and teaching it to others and making it public property." [34] Behind this hearkening back to old ideas of "guild secrets" is Taylor's persistent and fundamental notion that the improvement of work methods by workers brings few benefits to management. Elsewhere in his testimony, in discussing the work of his associate, Frank Gilbreth, who spent many years studying bricklaying methods, he candidly admits that not only *could* the "science of bricklaying" be developed by workers, but that it undoubtedly *had been:* "Now, I have not the slightest doubt that during the last 4,000 years all the methods that Mr. Gilbreth developed have many, many times suggested themselves to the minds of bricklayers." But because knowledge possessed by workers is not useful to capital, Taylor begins his list of the desiderata of scientific management: "First. The development—by the management, not the workmen—of the science of bricklaying." [35] Workers, he explains, are not going to put into execution any system or any method which harms them and their workmates: "Would they be likely," he says, referring to the pig-iron job, "to get rid of seven men out of eight from their own gang and retain only the eighth man? No!" [36]

Finally, Taylor understood the Babbage principle better than anyone of his time, and it was always uppermost in his calculations. The purpose of work study was never, in his mind, to enhance the ability of the worker, to concentrate in the worker a greater share of scientific knowledge, to ensure that as technique rose, the worker would rise with it. Rather,

the purpose was to cheapen the worker by decreasing his training and enlarging his output. In his early book, *Shop Management*, he said frankly that the "full possibilities" of his system "will not have been realized until almost all of the machines in the shop are run by men who are of smaller calibre and attainments, and who are therefore cheaper than those required under the old system." [37]

Therefore, both in order to ensure management control and to cheapen the worker, conception and execution must be rendered separate spheres of work, and for this purpose the study of work processes must be reserved to management and kept from the workers, to whom its results are communicated only in the form of simplified job tasks governed by simplified instructions which it is thenceforth their duty to follow unthinkingly and without comprehension of the underlying technical reasoning or data.

Third Principle

The essential idea of "the ordinary types of management," Taylor said, "is that each workman has become more skilled in his own trade than it is possible for any one in the management to be, and that, therefore, the details of how the work shall best be done must be left to him." But, by contrast: "Perhaps the most prominent single element in modern scientific management is the task idea. The work of every workman is fully planned out by the management at least one day in advance, and each man receives in most cases complete written instructions, describing in detail the task which he is to accomplish, as well as the means to be used in doing the work. . . . This task specifies not only what is to be done, but how it is to be done and the exact time allowed for doing it. . . . Scientific management consists very largely in preparing for and carrying out these tasks." [38]

In this principle it is not the written instruction card that is

important.* Taylor had no need for such a card with Schmidt, nor did he use one in many other instances. Rather, the essential element is the systematic pre-planning and pre-calculation of all elements of the labor process, which now no longer exists as a process in the imagination of the worker but only as a process in the imagination of a special management staff. Thus, if the first principle is the gathering and development of knowledge of labor processes, and the second is the concentration of this knowledge as the exclusive province of management—together with its essential converse, the absence of such knowledge among the workers—then the third is the *use of this monopoly over knowledge to control each step of the labor process and its mode of execution.*

As capitalist industrial, office, and market practices developed in accordance with this principle, it eventually became part of accepted routine and custom, all the more so as the increasingly scientific character of most processes, which grew in complexity while the worker was not allowed to partake of

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* This despite the fact that for a time written instruction cards were a fetish among managers. The vogue for such cards passed as work tasks became so simplified and repetitious as to render the cards in most cases unnecessary. But the concept behind them remains: it is the concept of the direct action of management to determine the process, with the worker functioning as the mediating and closely governed instrument. This is the significance of Lillian Gilbreth's definition of the instruction card as "a self-producer of a predetermined product." [39] The worker as producer is ignored; management becomes the producer, and its plans and instructions bring the product into existence. This same instruction card inspired in Alfred Marshall, however, the curious opinion that from it, workers could learn how production is carried on: such a card, "whenever it comes into the hands of a thoughtful man, may suggest to him something of the purposes and methods of those who have constructed it." [40] The worker, in Marshall's notion, having given up technical knowledge of the craft, is now to pick up the far more complex technical knowledge of modern industry from his task card, as a paleontologist reconstructs the entire animal from a fragment of a bone!

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this growth, made it ever more difficult for the workers to understand the processes in which they functioned. But in the beginning, as Taylor well understood, an abrupt psychological wrench was required.* We have seen in the simple Schmidt case the means employed, both in the selection of a single worker as a starting point and in the way in which he was reoriented to the new conditions of work. In the more complex conditions of the machine shop, Taylor gave this part of the responsibility to the foremen. It is essential, he said of the gang bosses, to "nerve and brace them up to the point of insisting that the workmen shall carry out the orders exactly as specified on the instruction cards. This is a difficult task at first, as the workmen have been accustomed for years to do the details of the work to suit themselves, and many of them are intimate friends of the bosses and believe they know quite as much about their business as the latter." [41]

Modern management came into being on the basis of these principles. It arose as theoretical construct and as systematic practice, moreover, in the very period during which the transformation of labor from processes based on skill to processes based upon science was attaining its most rapid tempo. Its role was to render conscious and systematic, the

* One must not suppose from this that such a psychological shift in relations between worker and manager is entirely a thing of the past. On the contrary, it is constantly being recapitulated in the evolution of new occupations as they are brought into being by the development of industry and trade, and are then routinized and subjugated to management control. As this tendency has attacked office, technical, and "educated" occupations, sociologists have spoken of it as "bureaucratization," an evasive and unfortunate use of Weberian terminology, a terminology which often reflects its users' view that this form of government over work is endemic to "large-scale" or "complex" enterprises, whereas it is better understood as the specific product of the capitalist organization of work, and reflects not primarily scale but social antagonisms.

formerly unconscious tendency of capitalist production. It was to ensure that as craft declined, the worker would sink to the level of general and undifferentiated labor power, adaptable to a large range of simple tasks, while as science grew, it would be concentrated in the hands of management.

Notes

27. Friedmann, *Industrial Society*, p. 63.
28. *The Principles of Scientific Management*, p. 111.
29. Ibid., p. 36.
30. Ibid., p. 22.
31. *Shop Management*, pp. 98–99.
32. *The Principles of Scientific Management*, pp. 37–38.
33. *Taylor's Testimony before the Special House Committee*, pp. 235–236.
34. Loc. cit.
35. Ibid., pp. 75, 77.
36. *The Principles of Scientific Management*, p. 62.
37. *Shop Management*, p. 105.
38. *The Principles of Scientific Management*, pp. 63, 39.
39. Lillian Gilbreth, *The Psychology of Management* (1914), in *The Writings of the Gilbreths*, William R. Spriegel and Clark E. Myers, eds. (Homewood, Ill., 1953), p. 404.
40. Alfred Marshall, *Industry and Trade* (London, 1919, 1932), pp. 391–393.
41. *Shop Management*, p. 108.

2

ON THE DEGRADATION OF SKILLS

W. FORM

W. Form, 'On the degradation of skills', *Annual Review Sociology*, 13, 1987, pp. 29–47

Abstract

Although social scientists have long believed that mechanization degrades skills, they disagree on the meaning and measurement of skills. A dominant view stresses that capitalists simplify skills to increase efficiency and profits; another, that managers deskill jobs to increase control over workers and work organization. Although case studies document the disappearance of many crafts during the industrial transformation of Britain and the United States, they do not show that skills as a whole declined. Recent historical studies reveal that industrialization may have created as many new skills as it destroyed, that early manufacturing used many traditional skills, and that new industrial skills were genuine. They also show that scientific management deskilled workers slightly and that management successfully wrested control of work organization from the traditional crafts. Twentieth-century census data reveal little aggregate compositional change in the skill distribution of major occupations. Short-term studies of individual occupational skills show little or no aggregate change. Finally, case studies of automation suggest that its deskilling effects vary greatly by occupation and industry. Firm conclusions about skill degradation must await time-series analysis of national surveys that measure components of occupational skills in different industries.

INTRODUCTION

For over two centuries social scientists believed that the mechanization of labor and the factory system speeded up the division of labor, diluted workers' skills, and increased their unhappiness. In 1776 Adam Smith described the stultifying effects of specialization in terms quite like those that Marx used in 1850 to condemn capitalism's mechanization of labor. And in 1893 Durkheim (1964:371) condemned as immoral the process whereby mechaniza-

tion was turning workers into appendages of machines. In his essays on workmanship, absentee ownership, and the engineers, Veblen (1914, 1921, 1923) traced the history of capitalism's avaricious drive to mechanize, to destroy workers' skill, and to subjugate science and government to its purposes. A generation later Mills (1951:Ch. 10) concisely elaborated Veblen's analysis. From Walker & Guest's *Man on the Assembly Line* (1952) to Aronowitz's (1973) *False Promises*, a steady stream of case studies documented Mills's scenario. Therefore, sociologists who knew this literature were surprised at the enthusiastic reception given to Braverman's (1974) thesis of the degradation of work in the twentieth century. But Braverman was riding a wave of concern about the crisis of work in America (see US HEW 1973), a crisis that empirical research failed to confirm (Form 1974, Hamilton & Wright 1986:68).

However, Braverman did make three contributions. By framing deskilling as an evidentiary debate between Marxists and non-Marxists, he opened a long-needed channel of communication between the two. He integrated scattered ideas on skill degradation into a coherent Marxist framework. He modernized Marxist thought by showing that monopoly capital was using automation to deskill blue- and white-collar jobs just as early capitalists used mechanization to deskill the proletariat. Thus, automation continues to enlarge the working class and the reserve army of labor by deskilling the jobs of clerical, technical, and professional workers.

This essay examines the widely-held historical proposition that most Marxists and non-Marxists share: that work under capitalism is deskilled. The validity of many related ideas (e.g. control of work or the labor process, growth of the proletariat) depends on the prior validity of the deskilling thesis. Yet three stubborn facts obstruct consensus about skill change. First, scholars disagree on the meaning and measurement of skill. Second, since researchers have not compared deskilling in capitalist and noncapitalist societies, they cannot conclude that whatever happened under capitalist industrialization was unique. Third, even the best historical data cannot provide definitive answers to questions about skill trends. Below the first and third problems are discussed in detail.

MEANING AND MEASUREMENT OF SKILL

All scholars ostensibly agree that skill refers to job complexity: the level, scope, and integration of mental, interpersonal, and manipulative tasks required in a job (Spenner 1979). Yet in their research scholars introduce four different conceptions of skill that obscure the centrality of job complexity (Steiger 1985). First, scholars in the idealistic tradition postulate that the fulfillment of human nature requires work that balances physical and mental

skills. Human potential cannot be realized unless workers as total personalities engage in meaningfully skilled tasks, using their minds to conceive and plan while they use their hands and tools. Anything less damages the human spirit. Since this craft-artisan ideal requires a balanced integration of mental and physical skills, the labor of both the mathematician and the assembler are degraded because their work is unbalanced (Steiger 1985). Consequently, whatever empirical research discovers, idealists insist that most industrial occupations are degraded because they do not allow this balance of skills. In practice, the professions are not thought to be as degraded as manual labor even though professions do not require physical skills. Idealists also assume that most preindustrial workers were skilled (Form 1976) and therefore more fulfilled than today's employees. Finally, because idealists think of skills as being in the person rather than in the job, they conclude that most workers are deskilled because they have more skills than their jobs require.

Second, some scholars use a market or a human capital view of skill. They implicitly accept high market demand or individual capacity to perform complex tasks as measures of skill. Both the teamster of horses and the file clerk are unskilled because there is no demand for horse teamsters and almost all workers can file. Obviously, neither market demand nor individual capacities are necessarily related to skill requirements of jobs.

Third, degree of job skill is often confused with extent of specialization and routinization. The more divided and routine a job, the more unskilled it is and vice versa. This view equates task specialization and routineness with task simplicity. Obviously, specializations and routines may be simple or complex; they may require short or long preparation (Smith & Snow 1976). Brain surgeons are more specialized but not necessarily less skilled than general practitioners. Though both assembling and typing are routine jobs, illiterates can quickly learn assembly work but not typing.

Fourth, some scholars think that self-direction, autonomy, and task improvising (Kohn & Schooler 1983) or responsibility or control over people and resources (Spaeth 1985) necessarily make jobs more complex. Obviously, many exceptions exist. Janitors have high work autonomy and task variety, but all tasks may be simple. Also, supervisors' work is often less complex than that of their subordinates. Because most professionals and administrators receive higher incomes than subordinates, the former jobs are considered more skilled. Thus, a market view of skill adds on the autonomy-supervision criterion to justify income inequality (Johnson 1980).

Scholars who avoid the pitfalls of these four perspectives have concluded that skill is multidimensional and that it contains at least two primary dimensions: substantive complexity and autonomy. Though the two dimensions correlate quite highly (.50–.70), measures of complexity are superior to those of autonomy (Spenner 1986). In factor analysis, reliable indicators of each

factor appear in the structure of the other (Miller et al 1980:180), suggesting interaction complexities. Since specific jobs contain different mixes of the two dimensions, using both dimensions complicates the comparison of overall job skills. Because the substantive complexity of jobs consistently correlates highly with all variables dealing with autonomy, supervision, task variety, control, and repetition (Spenner 1980), substantive complexity is a satisfactory general measure of skill. Though researchers are aware of shortcomings in the measure of substantive complexity (Miller et al 1980), they rely on the *Dictionary of Occupational Titles* (DOT) measure as the best available. When such a measure is unavailable, as in historical research, probably the best indicator is the total preparation time a job requires for an average worker to attain an average level performance. This should include years of general education, time for special vocational or professional training, and on-the-job experience. Yet, three major sources of error appear in this measure. First, though jobs are specific to specific organizations, researchers can only compare workers who share occupational titles. Since the fit between specific jobs and occupational titles varies widely by place and time, considerable variation enters the measure. Second, because informal agreements, labor union practices, and occupational licensing have built-in credentialism (Collins 1979), total preparation time for many occupations is inflated or unknown. Third, some jobs and their incumbents grow in skill over time (Spenner 1986).

Without a comprehensive measure of occupational skill, we cannot conclusively answer such basic questions as: How much skill do occupations require? How much do occupational skills change over time? What is the skill range in the labor force, and how much does it change over time? Although answers to these questions require representative samples of occupations and industries over extended periods, scholars do not hesitate to forge theories about societal trends based on a few cases that extend over short periods. This chapter reviews studies that attempt to measure skill changes in the West for three periods: the early era of industrial transformation, the era of mature industrialism, and the age of automation.

CRAFTS IN THE ERA OF INDUSTRIAL TRANSFORMATION

Efficiency and Power Theories on the Division of Labor

Both Adam Smith and Karl Marx thought that capitalists divided labor and deskilled workers to increase productivity and profits. Though Durkheim disagreed with this motivational theory of the division of labor, sociologists have generally ignored Durkheim and embraced the Smithian utilitarian position (Kemper 1972): Managers divide labor and introduce machinery to

reduce labor costs and increase profits. This theory fits both classic economic and traditional materialist theories of capitalist development (Form 1980).

In 1971, Marglin proposed a power theory (see Krause 1982). In an attack on efficiency theory, he contended that at the onset of the industrial revolution, capitalists devised the factory system not to increase productivity and profits but to increase their control over workers. Since the technology, division of labor, and productivity of early textile factories were not superior to those of home production, capitalists must have corralled workers into factories not to increase profits but to deskill them, deprive them of control over production, and thereby end their monopoly of knowledge about production. Though capitalists could have introduced machines that preserved workers' skills and yet maintained profit margins, they chose the control option. In short, capitalists made a social or power choice rather than an efficiency one in deskilling labor and introducing new technology. Though Marglin reversed the causal direction between the forces and relations of production, the theory is still considered Marxist.

Two important ideas were added to Marglin's theory. First, owners continued to label some jobs as skilled in order to divide the working class and weaken its ability to fight management (Aronowitz 1973). Often with the collaboration of the "skilled," managers initiated training programs and awarded diplomas to maintain a facade of skill mobility. Second, Taylor's (1911) scientific management movement systemized the attack on workers' skills and their control of production. Scholars disagree about the historical evidence that supports each theory. Power theorists point to many case studies of management's successes (Zimbalist 1979), while efficiency theorists argue that the cases are not representative. Below I trace this controversy in the case studies.

Industrial transformation first occurred in England from roughly the late eighteenth to the late nineteenth centuries, from the first appearance of textile factories to the later consolidation of heavy industries. Though many scholars have studied this era, the picture of what happened to skills is still incomplete. Evidence has to be untangled from studies of other issues such as class conflict, proletarianization, resistance to mechanization, strikes, and technological change (see Tilly 1978).

Much of the research on the efficiency-power debate can be analyzed in terms of four propositions from power theory, taken from two critical studies: Marglin's (1974) research on the early British textile industry and Stone's (1974) study of the US steel industry in the late nineteenth century. The four propositions are: (*a*) capitalists devised the factory system and invented machines primarily to deskill workers and wrest from them control of production; (*b*) a system of internal factory subcontracting in which artisan masters actually controlled production slowed down deskilling and manage-

ment control over production; (*c*) management later eliminated subcontracting and gained imperative control over production and the deskilling process; (*d*) management retained skills nominally as social constructions to split the working class.

Factory System and Deskilling

Evidence that the factory system existed well before the advent of the machine (Durkheim 1964) somewhat weakens Marglin's thesis that industrial capitalism initiated the destruction of craft communities. Dividing and deskilling labor were underway long before the industrial revolution. Darnton (1984) showed that preindustrial large-scale artisan production was not marked by harmony among masters, journeymen, apprentices, and day laborers, and Dobson's (1980) research on labor disputes in preindustrial England suggests that alienation, impersonality, work fragmentation, and work monotony were as widespread before as after the onset of the industrial revolution. No study could be located that both controlled technology and compared profits in the putting-out and factory systems when they existed side by side; such controls are needed to test Marglin's theory. If profits were the same or lower in the factory, the control argument could be supported. Of course, early factories could have increased both profits and controls.

Increasingly, historical evidence shows that many early factory workers remained skilled despite technological change. Mechanization most affected unskilled labor. The shift from artisan to machine production occurred slowly, especially in France (Hanagan 1977). The shift from worker to management control of production was also gradual and episodic. Freifeld's (1986) findings on deskilling in early British textile factories depart markedly from Marglin's. She found that through most of the nineteenth century, mule spinners remained skilled aristocrats of labor, retained their wage advantages over the less skilled, and continued to supervise production and monopolize knowledge about it. Though manufacturers of the self-acting spinning mules advertised that they would eliminate skilled labor, the machines had to be adjusted constantly in response to changing climatic and production conditions. In effect, spinners learned new skills in response to the new technology, while laborers remained unskilled.

Stone's (1974) study of the introduction of the blast furnace in US steel production in 1892 concluded that it led to a crucial strike; management finally deskilled craft workers and wrested from them control over production and exclusive knowledge of steel making. This deskilling of craft workers and the upgrading of unskilled labor to machine operatives equalized wages. Later, management introduced a finely scaled wage ladder to discourage working-class solidarity and militancy.

However, in reviewing steel production manuals from 1865–1940, Freifeld (1984) found that the introduction of blast furnaces did not eliminate the skills of melters, blowers, and rollers in steel-making because they continued until 1940 to make production decisions in the same pragmatic and judgment-based way. The new technology mechanized mainly the unskilled jobs of material handling, loading, and the moving of ore, molten metal, and finished products from one part of the plant to another. Craft workers did lose overall control of the daily management of the mills, including the training and control of helpers, but this did not affect their craft skills. Nor did management create new labor hierarchies because labor had always been hierarchical and highly inegalitarian. In this case the skilled maintained their skills while the unskilled were upgraded to semiskilled machine operators.

More (1980) studied the critical period of rapid industrialization (1870–1914) in Britain when the alleged homogenization of skills led to the formation of industrial unions. In analyzing 440 biographies of manual workers who started to work in the Edwardian era, he found that mechanization's impact on skills varied by industry. Although Marx's analysis of the textile industry was correct, the industry was not representative. Thus, skill requirements increased in metal manufacturing, chemicals, electricity, gas, and maintenance services. Here the labor aristocracy shifted its traditional skills to fit the new basic industries (Hobsbawm 1964). More (1980) further concluded that the rise of industrial unions resulted not so much from the erosion of craft skills but from upgrading the education and task requirements of unskilled labor.

Subcontracting and Retention of Skills

Clawson (1980) amplified Braverman's thesis that capitalism's drive to deskill workers was delayed by the practice of internal subcontracting that persisted up to the 1870s. In the early factories, artisan subcontractors, rather than management, controlled production and the use of technology. Subcontractors operated efficiently because they shared production knowledge with skilled workers. Capitalists later eliminated subcontracting, deskilled the workers, and changed the foreman's function from directing production to securing worker obedience. Owners' decisions were motivated by a desire not to increase plant efficiency but to establish class hegemony over knowledge and control of production.

Littler (1982a,b) examined subcontracting in more industries and countries and over longer periods. He concluded that Braverman's thesis is too simple, ethnocentric, and general. For example, owners as well as subcontractors controlled nineteenth-century shops. Indirect owner control took different forms in different industries. It was not a hindrance to capitalist industrial

hegemony. Indeed, subcontractors themselves sometimes behaved like employers as well as employees. Braverman equated internal subcontracting and craft control. Yet work was subcontracted to families in textiles, to artisan masters in construction and metal working, and to gang bosses in mining and ship loading. Direct employer and foreman control typically prevailed in new industries such as brewing and government services. External subcontracting dominated sweated trades such as clothing and shoemaking. Subcontracting and craft control persisted in some industries much longer than heretofore assumed, perhaps up to World War I. Craft deskilling (and upgrading) occurred largely in a nonconfrontational framework—as in the redistribution of occupations in new industries—and as a response to new production processes (Littler 1982a: 144). Again, no study could be found that compared the efficiency of a shop before and after the termination of artisan subcontracting, so the motive for the change and its economic consequences remain speculative.

Craft Responses to Managerial Controls

By World War I, managers had drastically reduced subcontracting and centralized their control over production. Power theorists assert that management, by introducing new technology and organizational controls, successfully deskilled the crafts and gained control over the work process. Whatever their stance on the deskilling issue, most scholars do not accept the contention that management successfully overcame worker resistance. Unfortunately, the literature on this topic is troubled by inconsistent terminology: artisan, master, skilled worker, small entrepreneur, and craft worker can refer to the same or different occupations. Thus, Foner (1976) stated that 75% of artisans, petty tradesmen, skilled and unskilled workers in colonial New York were common laborers and seamen. Moreover, occupational designations (shoemakers) sometimes refer to a trade or an industry that contains several occupations (stitchers, cutters, finishers) of varying skills.

Although most studies of deskilling describe the situation in large factories, artisan industries probably employed a majority of production workers until 1900. Bauman's (1972) history of unskilled, semiskilled, and craft workers, and union officials in British industry from 1750 to 1924 revealed that working-class stratification persisted during the entire period. Artisan skills were needed in the early factories because the first primitive machines replaced mostly unskilled labor. Even later machines that did more complicated work did not eradicate all of the old skills; e.g. the linotype did not eliminate compositors (Wallace & Kalleberg 1982). Moreover, many new machines often required new skills and craft workers typically operated them. Since management still needed some of the old crafts, managers shifted some

craft workers to the new machines. And skilled workers demanded to operate the machines to establish control over them.

Penn (1982) showed that skilled workers resisted deskilling in the cotton and engineering industries especially when their labor was scarce. In printing and construction (Jackson 1984) the crafts both protected and changed their skills in the face of new technology. The expansion of product markets sometimes did not reduce the number of skilled workers; instead it expanded unskilled and semiskilled jobs. In some instances craft unions (Jackson 1984) and unorganized craft workers who were socially cohesive (Calhoun 1982) (rather than management) aggressively shaped the work organization in response to new technology. In other situations some occupational skills were mechanized (making of windows, cabinets, and molding for carpenters) but not others (Calhoun 1982). Sadler (1970) showed that the skill requirements of new machines were often unknown, but their newness and prestige called for skilled operators who were later replaced by semiskilled workers. This often happened in newly industrializing societies (Form & Pampel 1978). On the other hand, new industries could be and were launched that used mostly unskilled and semiskilled labor. In short, the pattern of skill changes varied widely in response to many conditions (Hall and Miller 1975).

Social Construction of Skills

Finally, power theory holds that skills no longer exist among manual workers except as social constructions that capitalists impose to split the working class. Support for the thesis rests on five propositions: Skill is a status and not a functional designation (many "skills" take a short time to learn); job training is unrelated to skills used on the job; employers use degrees and certificates to eliminate "undesirable" applicants; most workers are overeducated for their jobs; and work performed by the "skilled" is eventually transferred to the less skilled (Sadler 1970). Though these propositions are backed by impressive case studies (Collins 1979), other studies challenge them as unrepresentative and inconclusive.

Hobsbawm's (1964) classic history of the labor aristocracy showed that it was formed from 1840 to 1890, the period when skilled workers shifted from traditional crafts to the new basic industries. During this era, the crafts resisted deskilling not only by restricting their own supply but also by inaugurating training programs to teach the new skills needed to operate the new machines (Penn 1984). More (1980) also examined the certification thesis in the Edwardian era (1870–1914) in England, when certification presumably began. Data from his 440 working-class biographies show that apprenticeship survived and grew, especially in the newly expanding mechanized industries. More argues that if skills were not needed, apprenticeship would have declined, but it did not. Moreover, strikes by skilled workers

succeeded without the support of the nonskilled. This suggests that skills were difficult to replace and that craft workers did not need the help of the less skilled. The crafts did gradually lose control of the apprentice system and management began to train semiskilled workers to perform some skilled tasks.

Lindert & Williamson's (1977) US study of a century of skill wage differentials and Penn's (1985) study of a century of British differentials showed that they remained high from 1850 to 1950, hardly possible if skills were easy to acquire. Comparing the backgrounds of 40 contemporary US occupational groups, Bielby & Kalleberg (1977) found that craft workers were unique for their long and specific vocational training. In attacking the hierarchy fetishism thesis, Sabel (1982) explains that intermediate level workers steadily acquire skills especially when technology is changing. Once they acquire skills, workers regard them as valuable property to be protected. Finally, the need for skills in changing industries explains both the continuous training feature in the internal labor markets of large industries (Roomkin & Sommers 1974) and the high turnover of skilled workers in the turbulent labor markets of small innovative industries (Sabel 1982). In short, it appears that the least supported proposition in power theory is that hierarchy fetishism is a managerial innovation to split the working class. A wealth of studies show that skilled workers in both capitalist and socialist societies struggle to preserve wage differentials without help from management (Form 1986). Historically, managers try to reduce both wage differentials and their reliance on skilled workers.

These case histories are suggestive but not decisive on the extent and type of skill changes that occurred during the transition from handicraft to mechanical production, and least conclusive of all for clerical, professional, and managerial occupations. However, the cases do reveal a process much more complex than recognized heretofore. Mechanization undoubtedly had different effects on different occupations in different industries under different market conditions. The effect also varied with type of machines introduced, management policies, type of labor union, class organization, economic structure, and other factors. These contingencies impede the ability to generalize about trends over the past two centuries. Only one finding seems certain: craft workers lost control over the organization of production in the factories, if not control over their own work. Insofar as this loss diminished job complexity, craft workers lost some skill. Whether this was compensated by other skill gains is unknown.

SKILL CHANGES IN INDUSTRIAL SOCIETIES

The inconclusiveness of case studies forces researchers to examine skill changes in the occupational structure as a whole. This enterprise may be undertaken in three ways. First, on the assumption that occupational skills do

not change, researchers may examine the changing number of workers in the occupations (graded by skill level) over a period of time to ascertain whether the aggregate changes point to increasing or decreasing skill. Second, researchers may consider individual occupations as units and examine skill changes in them over time. These changes are then aggregated to determine the direction of skill changes. Third, both methods can be combined; compositional changes in the occupations may be examined along with changes in the skills of the occupations. Though the third method is the best, all three methods are fraught with difficulties, not the least of which is that new occupations appear and old ones die. The second and third methods especially depend on the availability of reasonably accurate historical data on occupational complexity.

Unfortunately, adequate occupational census data are not available before 1900 and even current data leave much to be desired. Nonetheless, skill degradation theory holds that skills have declined steadily since the beginning of the industrial revolution. Mechanization, division of labor, and centralization of managerial authority were the devices that owners used to deskill workers until the twentieth century. At that time, the theory holds, scientific management turned ad hoc attacks on skills into a systematic drive. I examine below studies of skill changes in the occupational structure of mature industrial societies.

Skills in Early Industrial Cities

Many scholars assume that skills in early industries societies were higher than in mature industrialism. Although adequate data on the occupational composition of eighteenth and nineteenth century cities are not available, social historians have tried to reconstruct them for some cities. Rancière (1983) believes that historians have overestimated the skills of manual workers in these cities. I located fourteen studies that reconstructed the skills of manual workers in early US and European cities (Form 1980). Artisans and skilled workers comprised from 25% to 54% of the totals, while laborers, servants, and other unskilled workers ranged from 25% to 50%. All of the studies counted male household heads, the most likely to be skilled. But all studies omitted one or more categories in which workers were less likely to be skilled: single males, women in domestic and industrial employment, unpaid family workers, women and children who worked for their room and board, transients, vagabonds, and the unemployed (see Beier 1978, Brown 1977). I estimated that these studies omitted from 15% to 40% of the less skilled. These limited data suggest that manual skills in industrial cities before 1900 probably differed little from those today.

Scientific Management and Skills

According to skill degradation theory, Taylor's (1911) scientific management movement was the decisive social invention that deskilled workers and gave

management imperative control over all work. Since the movement's high point coincided with business's largely successful drive to eliminate unions, some scholars claim that Taylorism was a rallying business ideology to justify management's industrial dictatorship in the name of efficiency (Burawoy 1978, Calhoun 1982:202) and to undermine public support for union goals (Montgomery 1976). However, Nelson's (1980) careful study of Taylor holds that workers occupied a small place in his total system. He devoted less attention to time and motion studies and wage systems than to reorganizing managerial planning, the tool room, purchasing and accounting methods, functional supervision, and plant organization. As a program for management centralization, Taylorism threatened the vested interests of lower and middle management more than it did those of labor. Similarly, Littler (1982a) suggests that in Britain workers resisted the Bedeaux system (a form of Taylorism) less than foremen who insisted on "guiding" its application in their departments.

The cumulated studies suggest that Taylorism was implemented in various degrees in different industries, but in no country did it become widespread. Edwards (1979:101) asserts that Taylorism failed to solve the crisis of work control in the United States because most big corporations did not implement it, and where they did, workers fought it to a standsill. In England, Littler (1982a) reports that Taylorism spread to only a few industries that had not been established on a craft basis: beverage, tobacco, chemical, and textile. Taylorism was most successful in nonunionized firms that used mostly low-skilled labor. There it did more to control the pace of work than to dilute workers' skills. In short, though the exact impact of Taylorism on skills is unknown, it probably had only a marginal impact on the substance of skills. More likely, it subjected both workers and middle management to more centralized control, an observation that fits the conclusion of many case studies. Insofar as loss of autonomy reduces overall skill, Taylorism, where applied, must have reduced skills to a degree.

Compositional Skill Changes in Occupations

Some theorists argue that long-term urban occupational trends reveal that industrialization has increased skills by reducing unskilled work and increasing semiskilled, skilled, clerical, technical, professional, and administrative work. Postindustrial theorists (Bell 1973) proclaim that unskilled labor may ultimately disappear and that technical and professional work will predominate. Power theorists reply that census trends are illusory, that the numbers of skilled farmers have declined, clerical workers have become the new unskilled proletariat, the growing service sector is mostly unskilled, professional work and administrative work are losing skill, and rising educational requirements represent blatant credentialism (Braverman 1974:440).

Since all observers face difficulties in interpreting the loss of skills due to the decline in farming, they focus on the urban labor force. Power theorists claim that manual workers were more skilled in 1900 than today and that census figures now contain an upward skill bias. However, prior to 1900 the US Census reported occupational data by trades (shoes, printing, backing) and not by skill level. In 1900, the census shifted to classifying specific occupations by skill level, with the result that numbers of skilled workers were reduced by one-half, from the 1890 to the 1900 census; (Form 1979), contrary to the charge that the Census inflated skills (Hirsch 1978).

Scholars have tried to make occupational censuses comparable since 1900 (US Bureau of the Census 1975). Compositional changes in occupational strata from 1900 to 1980 point to skill upgrading as the pattern. Among manual workers, the unskilled declined, the semiskilled increased substantially, and the skilled increased slightly. Among women, the distribution of manual skills remained almost constant, domestics declined, and service and white-collar workers increased. But female labor force participation grew enormously. If skills did not decline in any occupational strata, the expanding white-collar sector alone would account for skill upgrading in the labor force (Fritscher 1977). Moore (1970) holds that professional, managerial, and administrative work have all become more complex. If true, skill degradation as a trend would depend critically on skill changes in the burgeoning feminized clerical occupations. As with manual workers, case studies of clerical workers tend to point to deskilling (Glenn & Feldberg 1977). But other scholars claim that clerical workers have always done routine work: copying, adding figures, and storing paper. Unless they were family members, few nineteenth-century clerks became business owners and managers (Davies 1974).

Unfortunately, measures of skill change do not go back for more than a few years. On the assumption that occupations do not change in skill, Dubnoff (1978) examined compositional changes (number of workers in each occupation) in US censuses from 1900 to 1970, using 1960 DOT measures of occupational complexity as the base: complexity of handling data, people, and things; general educational demands (GED), and special vocational preparation (SVP). He applied 1960 DOT measures to the 295 most populous occupations of the 559 in each Census and aggregated the increases or decreases in the occupations to obtain an overall skill change index. Summarizing changes in the high and low skill scores in 1900 and 1970, Dubnoff found compositional downskilling, particularly for women in lower skilled clerical occupations that deal primarily with data and people. Slight downgrading also appeared in manual occupations that deal primarily with things. SVP went down while GED went up.

Observing that Dubnoff's conclusions were based on visual inspection of complex cross-classifications of data that are hard to trace, Spenner (1982)

reanalyzed Dubnoff's data with log-linear strategy for each Census from 1900 to 1970. Analyzing each DOT skill indicator separately as a multicontingency table, the association by year, gender, occupational sector (manual vs non-manual), and skill, Spenner found that the dominant pattern of association was unrelated to compositional shifts by year. Rather, the association of skill level with gender and skill with occupational sector accounted for over 90% of the total skill association in all tables but one. Using five central indicators of skill level, he found no systematic evidence for a net compositional upgrading or downgrading for the United States for the period from 1900 to 1970. In short, apart from the dubious assumptions that occupations do not change in complexity and that 53% of the occupations represent the entire structure, Spenner demonstrated that we cannot accept any extant hypothesis about skill change.

Skill Changes in Individual Occupations

Spenner (1983) also completed the most comprehensive review of research on changes in the substantive complexity of the individual occupations in the US occupational structure. Eleven studies used direct measures of occupational skill. All together, the studies used 27 national data sets, including 16 census reports, 8 surveys, and 3 studies of the DOT. Seven studies used DOT skill measures that, despite imperfections, have sufficient construct validity to reflect skill changes (Parcel & Benefo 1987). Four investigations used self-reports of skill changes. Collectively, the studies covered a 40-year period, but the mode of the periods studied was about a decade. Six studies reported small occupational skill upgrading, four found mixed changes that cancelled each other, and one, which used percentage in supervisory occupations as a skill measure, found downgrading. The most careful of these studies (Spenner 1979) found that, even after all sources of error were considered, there was either no aggregate change or a slight upgrading of skills over a 12 year period.

The most comprehensive national survey (Mueller 1969) of individual self-reports of skill changes that occurred over a five-year period found skill upgrading both for workers who did not change jobs and workers who did. In short, despite Spenner's cautious conclusion that other dimensions of skill should also be investigated (especially autonomy), these studies of change in the complexity of all occupations cast serious doubt on the skill degradation hypothesis and any hypothesis of skill change.

SKILLS IN THE AGE OF AUTOMATION

While previous studies dealt with skill changes in the mechanization era, automation, a different form of technology, could affect skills differently.

Automation's distinctive feature is the use of electronic information feedback to operate equipment. When automation first appeared in the 1950s, many feared that it would cause even greater unemployment and deskilling than mechanization. Sustained prosperity temporarily allayed these fears; scores of studies reported skill upgrading effects (Wolfbein 1962). Changing economic conditions and further case studies spawned four theories on automation's effects. First, Blauner (1964) proposed a U theory: Mechanization caused deskilling whereas automation reverses that trend. Second, Braverman (1974) popularized Bright's (1966) "hump" theory: Automation first upgrades skills and then it accelerates the historic deskilling trend. Third, some writers (Danziger 1985) proposed a polarizing trend: Automation upgrades skilled jobs and downgrades the others. Fourth, Simpson (1985) summarized a contingency theory: Automation's effects are contingent on type of industry, occupation, market, and other factors. These four theories were also applied to automation's impact on worker autonomy.

Despite hundreds of automation studies, no one has tested all four hypotheses for major occupational and industrial groups. Unfortunately, one cannot aggregate the case studies to produce generalizations. For example, Bright's hump pattern seemed to apply to clerks: Most studies of early office automations found mildly positive effects (Hardin et al 1965, Shepard 1971), while recent studies found deskilling and proletarianization (Glenn & Feldberg 1977). But Attewell (1987) warned against premature conclusions: Most case studies have covered brief time periods, selected the most routine jobs for study, and ignored national surveys.

Perhaps because Braverman (1974) found that the application of numerical control (NC) technology to complex machining operations degraded machinists' skills, a stream of researchers have studied NC operations. Although Zicklin (1984) showed that Braverman systematically avoided contrary evidence, Noble's (1978) highly detailed case studies confirmed Braverman's contention that management makes a social and not an economic choice in designing NC systems in order to deskill machinists and break their monopoly of knowledge and control over production. But other case studies (Sabel 1982, Penn 1984) concluded that skill upgrading may be the norm. Jones' (1982) research convincingly supports contingency theory. In his study of several NC plants that varied in size, type of industry, innovation strategy, union and management structure, he concluded that though all these factors play a role, type of industry and type of production were critical. Deskilling occurred only in large-scale batch production industries. Nothing inherent about NC machines or the law of capitalistic exploitation forced a uniform response to automation.

Recently, researchers have studied "high tech" industries, where most employees work with automated equipment, to learn whether automation's effects are distinctive there. These industries vary so much in size, equip-

ment, product or service, occupational structure, and internal organization that generalizing about them may be as dangerous as it is for mechanical industries. Patterns vary widely by industry. Thus, automation destroyed old skills in publishing without creating comparable new ones (Wallace & Kalleberg 1982). In an information processing enterprise that provided patent and chemical information to professional clients, automation produced a one-machine industry. All workers, from professional chemists to clerks, worked with virtually the same desktop computers. Their responses to it had almost nothing to do with the computer's capability as a machine; rather, workers differed in the complexity of instructions that they fed the computers that, in turn, depended heavily on their educational level. While the computer enabled more intensive monitoring of simple jobs, it had no effect on traditional professional autonomy. In high-risk automated industries like atomic power, Hirschhorn (1984) reported that skill enlargement (workers learn more overlapping jobs) had to occur for all workers in order to reduce accident risk. In a study of 22 high-tech firms, Hodson (1985) found that skill disruption rather than skill up- or downgrading was the norm. Automation required that workers abandon old skills and learn new ones. Despite painful crises in organizational and work commitment, workers experienced a heightened sense of craft in response to demands for high quality work. Finally, Sullivan & Cornfield's (1979) analysis of Census findings disputed the claim that high-tech industries polarize skills. The limited national evidence points to upgrading.

In short, current research shows a bewildering variety of skill changes in high-tech industries. The case studies of automation seem to have the same liabilities as those of mechanical industries: They cover short periods, and they are not representative of industries, their occupations, technology, economic situation, and other relevant variables. The findings are not additive because replications are infrequent and studies neglect variables that may affect skill changes.

CONCLUSION

Skill degradation theory found most support in early case studies of dying crafts. Later historical research into a wider set of occupations demonstrated that these early findings could not be generalized. Still later studies of all occupations in the labor force pointed to little or no aggregate skill change. Increasingly, research has shown that skill changes depend on type of technology, industrial organization, product and labor markets, labor union strength, business power, and many other factors. But a list of contingencies does not comprise a coherent theory. Social science research has made little progress beyond disproving that single factor explanations (technology, capitalist ava-

rice, the free market) explain skill changes or beyond listing of possible factors that do. Clearly, no current theory can explain skill change in all stages of development in any industrial society. This suggests that for at least the present, our theories must be more historically specific and more sociological.

Because skills are embedded in a network of socially organized occupations, skill change should be studied as a result of on-going bargaining among occupations. Even in highly stratified work organizations, occupations struggle to divide skill, authority, earnings, work control, status, and privileges. It is naive to assume that all occupations place highest priority on preserving or increasing skills. Trade-offs among valued goods always occur. Therefore, research should examine how skill changes among interacting occupations accompany changes in the distribution of earnings, work control, profits, unemployment, and other valued goods. Perhaps the unit of observation should not be individual occupations but clusters of interdependent occupations that appear in different types of work organizations. Some labor union contracts, for example, contain data on the distribution of valued goods. An historical analysis of contracts might provide cues about how the distribution of skills and valued goods change in different industries and countries.

ACKNOWLEDGMENTS

I am grateful to Joan Huber for suggestions that improved the manuscript and to Michael Wallace, Toby Parcel, and Robert Kaufman for hearing me out and giving me sage advice, even though I did not always follow it.

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3

DILEMMAS OF TRANSFORMATION IN THE AGE OF THE SMART MACHINE

S. ZUBOFF

S. Zuboff, *In the Age of the Smart Machine: The Future of Work and Power*, Basic Books, New York, 1988, pp. 3–12.

> The history of technology is that of human history in all its diversity. That is why specialist historians of technology hardly ever manage to grasp it entirely in their hands.
>
> —FERNAND BRAUDEL
> *The Structures of Everyday Life*

> We don't know what will be happening to us in the future. Modern technology is taking over. What will be our place?
>
> —A Piney Wood worker

PINEY WOOD, one of the nation's largest pulp mills, was in the throes of a massive modernization effort that would place every aspect of the production process under computer control. Six workers were crowded around a table in the snack area outside what they called the Star Trek Suite, one of the first control rooms to have been completely converted to microprocessor-based instrumentation. It looked enough like a NASA control room to have earned its name.

It was almost midnight, but despite the late hour and the approach of the shift change, each of the six workers was at once animated and thoughtful. "Knowledge and technology are changing so fast," they said, "what will happen to us?" Their visions of the future foresaw wrenching change. They feared that today's working assumptions could

not be relied upon to carry them through, that the future would not resemble the past or the present. More frightening still was the sense of a future moving out of reach so rapidly that there was little opportunity to plan or make choices. The speed of dissolution and renovation seemed to leave no time for assurances that we were not heading toward calamity—and it would be all the more regrettable for having been something of an accident.

The discussion around the table betrayed a grudging admiration for the new technology—its power, its intelligence, and the aura of progress surrounding it. That admiration, however, bore a sense of grief. Each expression of gee-whiz-Buck-Rogers breathless wonder brought with it an aching dread conveyed in images of a future that rendered their authors obsolete. In what ways would computer technology transform their work lives? Did it promise the Big Rock Candy Mountain or a silent graveyard?

> In fifteen years there will be nothing for the worker to do. The technology will be so good it will operate itself. You will just sit there behind a desk running two or three areas of the mill yourself and get bored.

The group concluded that the worker of the future would need "an extremely flexible personality" so that he or she would not be "mentally affected" by the velocity of change. They anticipated that workers would need a great deal of education and training in order to "breed flexibility." "We find it all to be a great stress," they said, "but it won't be that way for the new flexible people." Nor did they perceive any real choice, for most agreed that without an investment in the new technology, the company could not remain competitive. They also knew that without their additional flexibility, the technology would not fly right. "We are in a bind," one man groaned, "and there is no way out." The most they could do, it was agreed, was to avoid thinking too hard about the loss of overtime pay, the diminished probability of jobs for their sons and daughters, the fears of seeming incompetent in a strange new milieu, or the possibility that the company might welsh on its promise not to lay off workers.

During the conversation, a woman in stained overalls had remained silent with her head bowed, apparently lost in thought. Suddenly, she raised her face to us. It was lined with decades of hard work, her brow drawn together. Her hands lay quietly on the table. They were calloused and swollen, but her deep brown eyes were luminous, youthful, and kind. She seemed frozen, chilled by her own insight, as she solemnly delivered her conclusion:

> I think the country has a problem. The managers want everything to be run by computers. But if no one has a job, no one will know how to do anything anymore. Who will pay the taxes? What kind of society will it be when people have lost their knowledge and depend on computers for everything?

Her voice trailed off as the men stared at her in dazzled silence. They slowly turned their heads to look at one another and nodded in agreement. The forecast seemed true enough. Yes, there was a problem. They looked as though they had just run a hard race, only to stop short at the edge of a cliff. As their heels skidded in the dirt, they could see nothing ahead but a steep drop downward.

Must it be so? Should the advent of the smart machine be taken as an invitation to relax the demands upon human comprehension and critical judgment? Does the massive diffusion of computer technology throughout our workplaces necessarily entail an equally dramatic loss of meaningful employment opportunities? Must the new electronic milieu engender a world in which individuals have lost control over their daily work lives? Do these visions of the future represent the price of economic success or might they signal an industrial legacy that must be overcome if intelligent technology is to yield its full value? Will the new information technology represent an opportunity for the rejuvenation of competitiveness, productive vitality, and organizational ingenuity? Which aspects of the future of working life can we predict, and which will depend upon the choices we make today?

The workers outside the Star Trek Suite knew that the so-called technological choices we face are really much more than that. Their consternation puts us on alert. There is a world to be lost and a world to be gained. Choices that appear to be merely technical will redefine our lives together at work. This means more than simply contemplating the implications or consequences of a new technology. It means that a powerful new technology, such as that represented by the computer, fundamentally reorganizes the infrastructure of our material world. It eliminates former alternatives. It creates new possibilities. It necessitates fresh choices.

The choices that we face concern the conception and distribution of knowledge in the workplace. Imagine the following scenario: Intelligence is lodged in the smart machine at the expense of the human capacity for critical judgment. Organizational members become ever more dependent, docile, and secretly cynical. As more tasks must be

accomplished through the medium of information technology (I call this "computer-mediated work"), the sentient body loses its salience as a source of knowledge, resulting in profound disorientation and loss of meaning. People intensify their search for avenues of escape through drugs, apathy, or adversarial conflict, as the majority of jobs in our offices and factories become increasingly isolated, remote, routine, and perfunctory. Alternatively, imagine this scenario: Organizational leaders recognize the new forms of skill and knowledge needed to truly exploit the potential of an intelligent technology. They direct their resources toward creating a work force that can exercise critical judgment as it manages the surrounding machine systems. Work becomes more abstract as it depends upon understanding and manipulating information. This marks the beginning of new forms of mastery and provides an opportunity to imbue jobs with more comprehensive meaning. A new array of work tasks offer unprecedented opportunities for a wide range of employees to add value to products and services.

The choices that we make will shape relations of authority in the workplace. Once more, imagine: Managers struggle to retain their traditional sources of authority, which have depended in an important way upon their exclusive control of the organization's knowledge base. They use the new technology to structure organizational experience in ways that help reproduce the legitimacy of their traditional roles. Managers insist on the prerogatives of command and seek methods that protect the hierarchical distance that distinguishes them from their subordinates. Employees barred from the new forms of mastery relinquish their sense of responsibility for the organization's work and use obedience to authority as a means of expressing their resentment. Imagine an alternative: This technological transformation engenders a new approach to organizational behavior, one in which relationships are more intricate, collaborative, and bound by the mutual responsibilities of colleagues. As the new technology integrates information across time and space, managers and workers each overcome their narrow functional perspectives and create new roles that are better suited to enhancing value-adding activities in a data-rich environment. As the quality of skills at each organizational level becomes similar, hierarchical distinctions begin to blur. Authority comes to depend more upon an appropriate fit between knowledge and responsibility than upon the ranking rules of the traditional organizational pyramid.

The choices that we make will determine the techniques of adminis-

tration that color the psychological ambience and shape communicative behavior in the emerging workplace. Imagine this scenario: The new technology becomes the source of surveillance techniques that are used to ensnare organizational members or to subtly bully them into conformity. Managers employ the technology to circumvent the demanding work of face-to-face engagement, substituting instead techniques of remote management and automated administration. The new technological infrastructure becomes a battlefield of techniques, with managers inventing novel ways to enhance certainty and control while employees discover new methods of self-protection and even sabotage. Imagine the alternative: The new technological milieu becomes a resource from which are fashioned innovative methods of information sharing and social exchange. These methods in turn produce a deepened sense of collective responsibility and joint ownership, as access to ever-broader domains of information lend new objectivity to data and preempt the dictates of hierarchical authority.

This book is about these alternative futures. Computer-based technologies are not neutral; they embody essential characteristics that are bound to alter the nature of work within our factories and offices, and among workers, professionals, and managers. New choices are laid open by these technologies, and these choices are being confronted in the daily lives of men and women across the landscape of modern organizations. This book is an effort to understand the deep structure of these choices—the historical, psychological, and organizational forces that imbue our conduct and sensibility. It is also a vision of a fruitful future, a call for action that can lead us beyond the stale reproduction of the past into an era that offers a historic opportunity to more fully develop the economic and human potential of our work organizations.

THE TWO FACES OF INTELLIGENT TECHNOLOGY

The past twenty years have seen their share of soothsayers ready to predict with conviction one extreme or another of the alternative futures I have presented. From the unmanned factory to the automated cockpit, visions of the future hail information technology as the final

answer to "the labor question," the ultimate opportunity to rid ourselves of the thorny problems associated with training and managing a competent and committed work force. These very same technologies have been applauded as the hallmark of a second industrial revolution, in which the classic conflicts of knowledge and power associated with an earlier age will be synthesized in an array of organizational innovations and new procedures for the production of goods and services, all characterized by an unprecedented degree of labor harmony and widespread participation in management process.[1] Why the paradox? How can the very same technologies be interpreted in these different ways? Is this evidence that the technology is indeed neutral, a blank screen upon which managers project their biases and encounter only their own limitations? Alternatively, might it tell us something else about the interior structure of information technology?

Throughout history, humans have designed mechanisms to reproduce and extend the capacity of the human body as an instrument of work. The industrial age has carried this principle to a dramatic new level of sophistication with machines that can substitute for and amplify the abilities of the human body. Because machines are mute, and because they are precise and repetitive, they can be controlled according to a set of rational principles in a way that human bodies cannot.

There is no doubt that information technology can provide substitutes for the human body that reach an even greater degree of certainty and precision. When a task is automated by a computer, it must first be broken down to its smallest components. Whether the activity involves spraying paint on an automobile or performing a clerical transaction, it is the information contained in this analysis that translates human agency into a computer program. The resulting software can be used to automatically guide equipment, as in the case of a robot, or to execute an information transaction, as in the case of an automated teller machine.

A computer program makes it possible to rationalize activities more comprehensively than if they had been undertaken by a human being. Programmability means, for example, that a robot will respond with unwavering precision because the instructions that guide it are themselves unvarying, or that office transactions will be uniform because the instructions that guide them have been standardized. Events and processes can be rationalized to the extent that human agency can be analyzed and translated into a computer program.

What is it, then, that distinguishes information technology from earlier generations of machine technology? As information technology is used to reproduce, extend, and improve upon the process of substituting machines for human agency, it simultaneously accomplishes something quite different. The devices that automate by translating information into action also register data about those automated activities, thus generating new streams of information. For example, computer-based, numerically controlled machine tools or microprocessor-based sensing devices not only apply programmed instructions to equipment but also convert the current state of equipment, product, or process into data. Scanner devices in supermarkets automate the checkout process and simultaneously generate data that can be used for inventory control, warehousing, scheduling of deliveries, and market analysis. The same systems that make it possible to automate office transactions also create a vast overview of an organization's operations, with many levels of data coordinated and accessible for a variety of analytical efforts.

Thus, information technology, even when it is applied to automatically reproduce a finite activity, is not mute. It not only imposes information (in the form of programmed instructions) but also produces information. It both accomplishes tasks and translates them into information. The action of a machine is entirely invested in its object, the product. Information technology, on the other hand, introduces an additional dimension of reflexivity: it makes its contribution to the product, but it also reflects back on its activities and on the system of activities to which it is related. Information technology not only produces action but also produces a voice that symbolically renders events, objects, and processes so that they become visible, knowable, and shareable in a new way.

Viewed from this interior perspective, information technology is characterized by a fundamental duality that has not yet been fully appreciated. On the one hand, the technology can be applied to automating operations according to a logic that hardly differs from that of the nineteenth-century machine system—replace the human body with a technology that enables the same processes to be performed with more continuity and control. On the other, the same technology simultaneously generates information about the underlying productive and administrative processes through which an organization accomplishes its work. It provides a deeper level of transparency to activities that had been either partially or completely opaque. In this way information

technology supersedes the traditional logic of automation. The word that I have coined to describe this unique capacity is *informate*. Activities, events, and objects are translated into and made visible by information when a technology *informates* as well as *automates*.

The informating power of intelligent technology can be seen in the manufacturing environment when microprocessor-based devices such as robots, programmable logic controllers, or sensors are used to translate the three-dimensional production process into digitized data. These data are then made available within a two-dimensional space, typically on the screen of a video display terminal or on a computer printout, in the form of electronic symbols, numbers, letters, and graphics. These data constitute a quality of information that did not exist before. The programmable controller not only tells the machine what to do—imposing information that guides operating equipment—but also tells what the machine has done—translating the production process and making it visible.

In the office environment, the combination of on-line transaction systems, information systems, and communications systems creates a vast information presence that now includes data formerly stored in people's heads, in face-to-face conversations, in metal file drawers, and on widely dispersed pieces of paper. The same technology that processes documents more rapidly, and with less intervention, than a mechanical typewriter or pen and ink can be used to display those documents in a communications network. As more of the underlying transactional and communicative processes of an organization become automated, they too become available as items in a growing organizational data base.

In its capacity as an automating technology, information technology has a vast potential to displace the human presence. Its implications as an informating technology, on the other hand, are not well understood. The distinction between *automate* and *informate* provides one way to understand how this technology represents both continuities and discontinuities with the traditions of industrial history. As long as the technology is treated narrowly in its automating function, it perpetuates the logic of the industrial machine that, over the course of this century, has made it possible to rationalize work while decreasing the dependence on human skills. However, when the technology also informates the processes to which it is applied, it increases the explicit information content of tasks and sets into motion a series of dynamics that

will ultimately reconfigure the nature of work and the social relationships that organize productive activity.

Because this duality of intelligent technology has not been clearly recognized, the consequences of the technology's informating capacity are often regarded as unintended. Its effects are not planned, and the potential that it lays open remains relatively unexploited. Because the informating process is poorly defined, it often evades the conventional categories of description that are used to gauge the effects of industrial technology.

These dual capacities of information technology are not opposites; they are hierarchically integrated. Informating derives from and builds upon automation. Automation is a necessary but not sufficient condition for informating. It is quite possible to proceed with automation without reference to how it will contribute to the technology's informating potential. When this occurs, informating is experienced as an unintended consequence of automation. This is one point at which choices are laid open. Managers can choose to exploit the emergent informating capacity and explore the organizational innovations required to sustain and develop it. Alternatively, they can choose to ignore or suppress the informating process. In contrast, it is possible to consider informating objectives at the start of an automation process. When this occurs, the choices that are made with respect to how and what to automate are guided by criteria that reflect developmental goals associated with using the technology's unique informating power.

Information technology is frequently hailed as "revolutionary." What are the implications of this term? *Revolution* means a pervasive, marked, radical change, but *revolution* also refers to a movement around a fixed course that returns to the starting point. Each sense of the word has relevance for the central problem of this book. The informating capacity of the new computer-based technologies brings about radical change as it alters the intrinsic character of work—the way millions of people experience daily life on the job. It also poses fundamentally new choices for our organizational futures, and the ways in which labor and management respond to these new choices will finally determine whether our era becomes a time for radical change or a return to the familiar patterns and pitfalls of the traditional workplace. An emphasis on the informating capacity of intelligent technology can provide a point of origin for new conceptions of work and power. A more restricted emphasis on its automating capacity can provide the occasion

for that second kind of revolution—a return to the familiar grounds of industrial society with divergent interests battling for control, augmented by an array of new material resources with which to attack and defend.

The questions that we face today are finally about leadership. Will there be leaders who are able to recognize the historical moment and the choices it presents? Will they find ways to create the organizational conditions in which new visions, new concepts, and a new language of workplace relations can emerge? Will they be able to create organizational innovations that can exploit the unique capacities of the new technology and thus mobilize their organization's productive potential to meet the heightened rigors of global competition? Will there be leaders who understand the crucial role that human beings from each organizational stratum can play in adding value to the production of goods and services? If not, we will be stranded in a new world with old solutions. We will suffer through the unintended consequences of change, because we have failed to understand this technology and how it differs from what came before. By neglecting the unique informating capacity of advanced computer-based technology and ignoring the need for a new vision of work and organization, we will have forfeited the dramatic business benefits it can provide. Instead, we will find ways to absorb the dysfunctions, putting out brush fires and patching wounds in a slow-burning bewilderment.

S7

4

LEARNING, EMPOWERMENT AND PARTICIPATIVE WORK PROCESSES: THE EDUCATIVE WORK ENVIRONMENT

H. KORNBLUH & R. GREENE

H. Kornbluh & R. Greene, 'Learning, empowerment and participative work processes: The educative work environment', in *Socialization and Learning at Work: A New Approach to Learning Processes in the Workplace and Society*, eds H. Leymann & H. Kornbluh, Avebury, Aldershot, 1989, pp. 256–74.

> There is the suggestion in the Norwegian [workplace democracy] experience that once you help people get in touch with their powers to learn, spill-over effects begin to happen. There seems to be less willingness to let learning be confined to the limits of prescribed program. Something happens when an 'ordinary person' gets the experience that 'I have words to say about the world,' and 'I will be attended to', ... When they feel so empowered, their learning capacities express themselves in multidimensional, unpredictable ways. It is not too far-fetched to say that they begin to sense an ethical right to have access to such experiences...
>
> A.G.Wirth, *Productive Work in Industries and Schools: Becoming Persons Again* (p. 184)

Today, learning at work is as important as any other factor in the production process. Why has it become so? Some observers have indicated a need to create 'learning organizations' to survive in 'turbulent' environments (Crombie, 1981; Williams, 1982). Workplaces that provide employees with built-in opportunities to learn and, therefore, to change, are more likely to

succeed in what has now come to be known as the post-industrial era.

In many enterprises, expensive new technology requires workers who understand more complex phenomena, who are more 'engaged', and who can solve problems and take on more individual and group responsibility (Hirschhorn, 1984). In addition, workers with increased levels of education have a greater appreciation of personal and group development at work, needs for more challenging and autonomous jobs (Yankelovich and Immerwahr, 1984), and ways continuously to increase their competence.

The relationship of workers' motivation to the amount of challenge in the job has been recognized and documented. Many Japanese firms that have applied this principle experience large productivity increases from developing work organization that involves many workers in *designing* parts of their workplaces as a continuous learning process. Labour market policy-makers in Scandinavia have also recognized through legislation that the goals of developing more 'engaged' workers and increasing workplace democracy depends on employees who are able to directly 'influence the work situation'. John Dewey (1916) analysed the relationships among education, learning and democracy. Realizing these ideals in workplaces depends on informed, growing and self-confident individuals and groups.

Unions that seek to serve the changing needs and aspirations of members and potential members can be a direct major force as an instrument of influence for workers to design learning and more meaningful jobs into the work situation, as has happened in some work reform efforts in Scandinavia.

Legislation can also be a means for recognizing these needs. Through such laws as the Swedish Industrial Democracy Law (MBL) and the 1976 Norwegian Work Environment Law, the Scandinavian countries have pioneered in developing an expanding concept of what constitutes a *healthy work environment* by mandating a design of work that emphasizes personal development and opportunities for workers to influence their work situation. (See Lennerlöf, this volume.) In North America, 'Right to Know' legislation mandates worker knowledge about their workplace health hazards.

Thus, creating opportunities for workplace learning and utilizing the effects of a learning process can be the next new direction in the continuing development of the work environment concept. This calls for a new way of looking at work: viewing the workplace through 'learning lenses'.

Although these changes are not easy to accomplish in practice, nevertheless, theoretical and practical constructs are important to develop and test. In another chapter in this volume, Richard Pipan develops the theoretical and historical framework for a 'curricular view of the workplace'. In this chapter, we shall explore what kinds of meaningful learning in the workplace can be developed beyond the usual formal education or training programmes, particularly for blue-collar workers whose job structures usually

afford fewer learning opportunities. What are the learning qualities of participative involvement? How do adult education and learning principles apply to work situations and to a work organization's structure and functioning?

The 'educative work environment'

A useful concept in relating learning to the workplace is the 'educative work environment'. What do we mean by this? It is the striving to maximize learning in the workplace through the way work, decision-making, technology and related processes are designed, maintained and redesigned. It includes the structuring and evaluating of work relationships based on their individual and mutual learning and knowledge-creation potential.

A work organization that fosters such an environment can be characterized as an organization *that values individual and group learning as highly as any other aspect of the productive process*, that is as conscious of learning as it is 'cost conscious' or 'quality conscious'. Effective adult education methods to reach these goals for adult workers include 1) learning through experience; 2) group involvement; and 3) genuine participation as educative media. These indicate a need for being conscious of *process*, as against *context*, as an important element in learning. A better name for this is 'non-formal education'. The workplace has a powerful potential for its intentional practice.

Why non-formal education is important

Particularly for blue-collar workers, the opportunity to learn and grow in the work situation itself is extremely important given their frequently experienced lack of 'success' in previous schooling situations (O'Toole, 1977). Non-formal education presents a framework for:

1. developing different ways to learn that are not based on a formal 'schooling' process that can discourage participation;
2. Utilizing what we know about the theory of how *adults* learn–in contrast to applying traditional 'pedagogic' theories to the adult learning process;
3. relying on learning through structures and processes in which work and work-related activities take place, and that do not require a large amount of formal education;
4. presenting a grounded understanding of theory, since it transforms concrete phenomena and experience into abstract knowledge that is immediately tried out and tested as new practice;
5. exposing and tapping everyday cognition in persons, and empowering

them in areas of new application and direction;
6. developing knowledge in new or different ways through utilizing interrelationships of people at work;
7. helping to equalize learning and growth opportunities in workplaces where power, influence, and compensation are otherwise mainly distributed through a status, credential-based system.

Non-formal education processes can, for all workers, include the learning of at least three kinds of intertwined competencies:
1) *work* competencies; 2) *learning* competencies (increase in the *ability* to learn and in the *consciousness* of learning); 3) *influence* competencies (the *ability* to *influence* the work situation, and the heightened consciousness of the increased *possibilities* for influence.) The integration of these competencies develops in a learning process that psychologists and educationists call the *empowerment process*.

Participation learning and empowerment as a process

Some valuable contributions have been made to the literature of work organization and learning in workplaces. Among those involved in the Tavistock studies and the Norwegian Industrial Democracy experiments, Herbst (1977, 1985) has shown how internal and externally linked learning networks have evolved out of the socio-technical systems (STS) approach to work organization. Thorsrud (1981) has analysed the learning process for social scientists and practitioners from the experience gained over time from successive work organization experiments. Elden (1981) has also shown how workplace participatory research can be viewed as a 'co-learning' process where researchers and workers share in some or all stages of work research. Hirschhorn (1984) has studied the training and learning needs of members of autonomous work group-based organizations, particularly in continuous process industries. Cohen-Rosenthal (1982) has related adult education principles to experiences in workplace quality of worklife programmes.

In addition, many authors have written about worker powerlessness and learned helplessness (see Lennerlöf, Chapter 2, this volume). There is also a literature on participation, learning and empowerment, but little of it relates to workplaces. Thus, it will be instructive to review three studies involving empowerment processes that highlight the relationship between participation and learning and provide some findings, insights and useful analyses that can be applied to developing principles and practices of *workplace* learning

Charles Kieffer (1981) studied fifteen selected working-class people from

various backgrounds and localities who moved from initial feelings of powerlessness to emerge as leaders through their participation in local community action organizations. He discovered that even though the individuals were chosen for differences in background, sex, location, etc., the evolution of empowerment for all of them was 'patterned and consistent' (p. 405) as the individuals embark on what becomes a *learned change* in their personal perspectives about authority and the way decisions are made that affect their lives.

From backgrounds of having learned to 'keep my mouth shut' and 'do what I'm told since others know best', Kieffer's participants learned that they can be equal partners in shaping these relationships. A 'demythification' of authority begins, as well as a 'demystification' of both the *processes* (political and social) that affect their lives and the *knowledge* they need to participate in these processes.

The role of an 'enabler' emerges as one critical element. Usually an outside organizer, this ' *caring facilitator* acts as *ally, role model, mentor, resource* and *friend*' (emphasis added pp.441 and 442) who *nurtures* and *helps emergent leaders sharpen their insights and strengths*. The enabler *helps people overcome inhibitions, myths, and feelings of inadequacy*. Reflections of participants illustrate this well. From one interview:

> He (the organizer) has wisdom. He's unselfish. Anything in his brain he can share, he does ... He takes time to discuss it with you himself ... He knows how to help us grow and how to help us see. (p. 255)

From another participant about another set of organizers:

> They all saw beyond me. They saw – they just didn't see me. They saw what I was *capable* of, what I *could* be. (p. 257)

In effect, an organizer/enabler helps to make apparent what the participant already knows and can do and what else needs to be discovered. Kieffer summarizes the spiral of learning and development that takes place through this whole process:

> The longer participants extend involvement, the more they come to understand. The more they understand, the more motivated they are to continue to act. The more they continue to act, the more proactive they are able to be. The more proactive they are able to be, the more they further their skill and effect. The more they sense their skill and effect, the more likely they are to continue. (p.422)

Kieffer emphasizes the importance of *experience* and *doing* as the *fundamental* basis of their learning. 'In contrast to the dominance of experiential learning, little effect is registered through more didactic educational approaches... knowing is a consequence of doing' (pp. 289,290). Feedback

(from enablers and peers), encouragement from early small successes, learning from failures – all are important ingredients in continued involvement and in sustaining development. The building of confidence and self-reliance emanating from the process leads to taking responsibility for one's own actions.

Most of the participants now see themselves as enablers. As Kieffer reports:

> Following the lead of their mentors, they act as resources and critical allies, and they explicitly avoid casting themselves in didactic or instructional roles. Understanding the elements of learning that helped them construct their own abilities and participator competence, they facilitate developmental dialogue and focus on individual need. (pp.413, 414)

This transformation is poetically summed up by the inscription on a poster hanging on the office wall of a former jailed drug addict, now president of a youth gang converted to helping neighbours renovate their decayed apartment buildings. It reads: 'The greatest good we can do for others is not just to share our riches with them but to reveal theirs to themselves'.

Some of these themes also appear in a study by Kindervatter (1979) that emphasizes looking at empowerment as a *group* process. Kindervatter surveyed nonformal education programmes for empowerment and analysed two projects using this approach in developing countries.

> Basically, empowering occurs through a number of stages. First people develop an initial awareness that they can take action to improve their lives and acquire some skills to enable them to do so. *Then through taking action, they experience a loss of impotence and increase in confidence*. Finally, as their skills and confidence continue to grow, people work jointly to exercise greater influence over decisions and resources which affect their welfare. (p.63) (emphasis added)

She notes that these stages have some similarity to Freire's (1972) 'conscientization process'.

Kindervatter relates the transfer of responsibility from the facilitator to the group:

> Over the course of the group's activities, the facilitator encourages participant leadership, and gradually a major transfer of responsibility for programmatic decision-making from the facilitator to learners occurs. The transfer is also made possible by the programme's democratic and nonhierarchical processes and relationships. Determining what and how they want to learn, group members develop some of the confidence and skills needed for collective action-taking. They acquire additional capabilities by participating in activities that strive for an integration of reflection and action and from methods which promote self-reliance. All the characteristics described above set the

process of empowering into motion and sustain its momentum. (p.246)

More recently, Ressner and Gunnarson (1986) examined the impact of group organization of work in automated offices in Swedish public enterprise. They interviewed members of self-steering work groups, personnel officers, union representatives and others in three such work places. Self-determination, assuming individual and group responsibility, increased work and influence competence, and enhanced self-confidence of the individual members of the group were among the changes perceived by group members and others

Ressner and Gunnarson show how independence or autonomy is intertwined with greater individual and group assumption of responsibility. They report that the interviewees often refer to the 'independence of work and their ability to decide things for themselves'. This meant that each employee was 'able to plan the day's work together with the other members of the group and be ... responsible for getting the job done. There was not a boss to disrupt planning.' As two employees put it, 'We are personally responsible for keeping everything going' (p.28), and, 'It is nice to feel that you have more responsibility because there is nobody else to blame if things go wrong; the buck stops here' (p.29).

Group organization of work provided experience for developing work and influence competencies. Work competencies were increased as each employee learned more about the jobs within the purview of the work group. In addition, the group improved its competence in group planning skills and work administration. As the authors observed:

> Group-organized work utilizes more aspects of the employees' resources and both demands and confers greater opportunities of co-operation, problem-solving, and decision-making. All in all, the new work organization can be said to have increased the demands made on knowledge, organizing capacity, and active responsibility of the members of the group. (p.28)

Group members also 'acquired a more holistic picture of the business ... because the group was generally both the first and the last link in the handling of business' (p.29), and they needed to coordinate and maintain liaison with other groups and units of the workplace. (This function *vis-à-vis* other groups was also rotated in the group.) The group also responded to *internal* satisfactions rather than to *external* rewards. As one person stated:

> I feel that people must be able to take responsibility for themselves and their own work and have a chance for rejoicing in their own successes. They don't have to depend on a boss telling you that you have done well. It can be enough for people to tell you that they appreciate what you are doing and you can appreciate yourself. (p.30)

A personal feeling of security gained from the group enhances the confidence and courage of the individual group members to make more decisions themselves. As one person responded: 'You don't have to ask other people about so many things. You get a bit more daring'. Thus, a spiral of increasing responsibility, experience, self-confident, work skills, influence competence, and autonomy is repeated in the work situation. Individual empowerment takes place in a framework of learned interdependence and mutuality.[1]

Empowerment at work

The work situation presents the opportunity for a powerful learning mechanism through structuring the work in groups that assume responsibility for decisions about the work they perform and how they perform it. Inherent in the structure and functioning of such groups are some of the important principles of adult learning that we will review. As Herbst (1976, p.42) points out, places in industry where explicit experiments in using such groups, or where more general participation programmes have led to such groups being formed, often end up concentrating on the *resulting end structure* produced, and dismiss or lose sight of the value of the processes of change that result in that structure. Empowerment, as described above, is an open-ended development sequence that no structure, *a priori*, can finally encapsulate.

However, pure open-ended development is hardly ever found in this world without 'resting places' – provisional encapsulations – that allow understanding, elaboration and mastery of new experience.

To capture empowerment as a part of all work organization means constantly to evolve structure in response to the empowerment that is going on in the organization. Yet organizational leaders today need some clear images of how to transform their workplaces into more educative work environments. Herbst (1985), in his contextual design work, has emphasized how a network of surrounding structures and events needs to be created around the new entity if the design is to 'stick' – endure through time in the sense of outlasting its founders.

Achieving educative work environments in organizations requires offering a vision and some starting points for launching themselves on this journey. However, portraying one 'right' structure about what learning in an organization means would be a fundamental mistake. Yet giving nothing more concrete than some directions would prevent organizations from starting out on the journey. The principles of adult education, when applied to empowerment learning, form a set of guidelines that very well might be specific enough to tempt organizations to follow them, while not betraying

the intent of the processual nature of developing learning strategies in organizations.

Herbst (1976, p.42) also warns that members in pilot projects often become 'elites', and run the risk of dissolving into technocratic implementations of 'right answers' when copied by others. The principles, approaches and practices for developing educative work environments offered below should contribute to preventing the technocratization of these efforts.

Andragogy – the theory of adult learning – and the workplace

Alongside of the empowerment learning process, the theory of adult learning – andragogy – can help develop an insight into and basic understanding of non-formal workplace learning and a model for its practice.

Malcolm Knowles (1980, 1984) adapted and developed the *andragogical* model of adult learning in contrast to the *pedagogical* model of teaching/ learning. The latter assumes:

1. the learner is a dependent personality casting upon the teacher the function of determining what, how, and when anything should be learned and judging whether it has been learned;
2. learners have little resources for learning so the main job of the teacher is to devise transmission techniques: lectures, readings, and audio/visual presentations 'banking education' as Freire (1972) describes it – depositing knowledge in learners' heads);
3. learners learn in order to advance to the next stage (through getting a grade);
4. learning is subject-centred, focused on prescribed content and curriculum design sequences according to the logic of the subject matter, and;
5. external pressures, (parents, competition for grades, etc.) are the main motivators.

Originating in The Netherlands over 100 years ago, andragogian theory, as adapted by Knowles, makes different assumptions about adult learners:

1. adults strive for autonomy and self-direction in learning;
2. adults learn through using their own and each others' experience;
3. 'adults become ready to learn when they experience a need to know or to do something in order to perform more effectively in some aspect of their lives';
4. adults have a task-centred or problem-centred orientation to learning, and;
5. for many adults, the internal motivators of self esteem, increased self-confidence, and recognition are more potent than the external motivators

of promotion, salary increase, etc.

What is important in the androgogical model is the design of a *process* of learning. Thus, a 'teacher' with a *content plan* for learning, as in the pedagogical model, gives way to an *enabler* or *facilitator* of learning – one who plays 'the roles of designer and manager of processes and procedures that will facilitate the acquisition of content by the learners' (Knowles, 1980). The enabler establishes a climate of *mutual respect, collaboration, mutual trust, supportiveness, openness* and *authenticity*, and involves the participants in processes of *mutual planning, diagnosing their own needs, formulating their learning objectives, designing learning plans* and *evaluating their learning* (Knowles, 1980, 1984).

Well-developed self-steering work groups and related work relationships, whether intentionally or not, carry through a process of learning that has the dynamic of empowering participants, developing 'learned influence' rather than 'learned helplessness' (see Lennerlöf, chapter 2, this volume), and has a theoretical base in adult learning theory. Though Knowles' theory is related primarily to individual adult learners with more formal adult education situations, it can be adapted to workplace learning.

The stages of empowerment

What we have just discussed can be summarized in the format of stages of empowerment. Increased responsibility, either negotiated or offered as an invitation, leads as we have seen, to experience in new domains of action and speech. This, in turn, causes new work competencies to develop and eventually to change the way people view themselves. Workers learn that they are more capable than the organization or their background had led them to believe. They learn that there is a great deal they can do well, and this process raises their level of confidence.

They live with this new confidence until they discover that their old images no longer fit their new capabilities. They have become more autonomous in their thoughts, actions and imagination. They increase contact with others and display a less obsequious attitude, more input into relationships, more playing with boundaries and opportunities. Their increased influence competencies lead to new skills being mastered – a leap in personal development, which in turn increases the scope of action and speech in the enterprise. As workers expose themselves to new situations in this wider scope of activity, quickly learned skills are increasingly called for. New rhetorics, new vocabulary sets, new social norms, must be rapidly confronted and mastered. In turn, this leads to increased learning competency.

When workers self-consciously realize what they mastered along this journey, they imagine even more that can be accomplished. Frequently, they see that the key to their own development is to enable the empowerment of those around them. If workers choose this route, others and eventually whole groups in the organization set out on this empowerment journey.

Work and learning can become functionally and positively intertwined (See Schurman, Chapter 4, this volume) in processes that can be developed intentionally and in an atmosphere that supports looking for the learning potential of all work-related decisions and relationships.

Learning consciousness in organizations

How does one apply this model to a work organization? With the understanding that different enterprises and industries have differing characteristics, we shall describe some of the implications for the structure and operation of such a work organization. Our prior analysis leads us to focus on four main areas:

1. developing learning enabler roles
2. developing work organization as learning milieux
3. developing meaningful participatory processes
4. developing a work climate committed to worker learning

Although all of these processes are intertwined, we shall discuss them separately and establish the linkages accordingly.

The learning enabler facilitator role – Performing the function of enabler of learning – of constantly *creating the conditions for learning* – is a very different role to assume compared to traditional roles in traditional productive units. Yet it needs to pervade the *Weltenschauung* – the way of looking at and thinking about the work situation – of all parties: managers and supervisors, professionals and technicians, and workers.

Let us look at managers and supervisors. Training, rewards and recognition can be part of an approach to changing the role of managers and supervisors to one that would be more aptly called 'leader/enabler'. The beginning of the transition to such a role is described by Hirschorn (1984) when he relates how at one plant that he researched,

> The supervisor felt he had to develop a theory of how other people learn in order to guide his own behavior. Working with an external consultant, he devised a 'level of thinking' typology to guide his dealings with workers. The supervisor believed that unless he was sensitive to the level of questions asked (by an employee), he would either overmanage or undermanage the group. He linked his management behavior to his role as a teacher and to a theory of how

people learn. (p.149)

The supervision function needs to be transformed to move as much responsibility for work and for learning into worker groups. In many cases, this means developing a group work process. Those chosen for supervision jobs need to have, or to learn, the characteristics that make for good enablers. Some management training programmes are now including a unit on 'how adults learn' (Knowles, 1984).

Workplace professionals and technicians also can assume the enabler function. In highly developed autonomous group-based work systems, they need to become *resource* people for workers who can draw upon their professional or technical knowledge, their different kinds of information and experiences. Thus, workplace professionals and technicians need to learn how to transmit and integrate what they know with what workers know. This new approach has implications for the curricula of engineering and other workplace-related professional and technical schools.

Workers need to learn how to work effectively with resource people. But, in addition, workers in organized work groups need to learn how to enable *each other* to learn in the process of developing their empowerment realizations. Hirschorn (1984), in studying training and learning needs of workers in the new computer-based work organization, has described the autonomous (self-steering) work group structure as a 'natural learning group'.

Learning in groups has enormous importance and potential. Workers can also learn something about *how* they and others learn in the process. For example, one of the authors asked a member of an autonomous work group in a chemical plant in Sweden what he liked about the way he was being taught his job by his fellow work team member. 'He teaches me in small doses and makes sure I try it out to see if I've learned it before we go on,' he replied. This Swedish team rotated the position of contact person (who coordinated work planning and other former functions of the foreman) every three months among qualified members. One qualification was that the team member had the experience of teaching his/her job. Some of the members of this team were also aware that they *learn* more about their job in the process of *teaching* it to someone else (Kornbluh, 1987).

Work organization – It should be obvious that the way work is organized significantly affects the quantity and quality of worker learning. Dull, repetitive, fragmented work does not produce a milieu for positive learning exchange. As we have shown, work organization based on group responsibility has many learning-related advantages. In addition, the *process* by which work is organized is extremely important and the process of design and implementation of work becomes an important learning opportunity that is discussed later in this article.

Process – Workplaces can be reviewed and evaluated for the ways they may incorporate learning processes. For example, the Tayloristic approach to work has workers physically *doing* something from start to finish of the workday. A more learning-oriented approach supports the need for workers to be involved in *reflective action* – time devoted to discussion for work planning and problem-solving, as well as working, and provides opportunities to integrate these activities into the work schedules. Important too is having time and support for workers, engineers and technical people to interact. This develops mutual respect in the process of mutual learning and developing new knowledge through this interaction in such areas as design of work facilities, work processes and technology.

Workers can also be deeply involved in processes of research relating to their work situations. Some basic development of these approaches has taken place in Norway (Herbst, 1976; Thorsrud, 1981; Elden, 1981, 1983). Rather than being the objects of professional research on questions that they have not helped define, and data analysis that they cannot influence, workers can be more directly involved in research that is carried on in and about workplaces. Elden (1981, 1985) has done important empirical and analytical work on this issue and has developed the concept of workers and researchers as *co-learners*. Although there are many problems with developing workers as participatory researchers, provision for unions to be able to *negotiate payment* for workers to become more meaningful research resources are steps that might result in greater worker involvement and learning through research efforts.

Many organizations are developing processes for involving workers in broad-based enterprise functioning and future planning (Polity, 1975; Emery, 1982; Williams, 1984). Called the 'Search Conference' by the Australians who have had much to do with its conceptualization, this approach has been used to develop new directions for the organization through involving and mixing people at all levels of the organization in future planning. In some organizations, search conferences have been used as a broader-based approach to strategic planning.

Climate – Experience with worker participation programmes has shown that middle management and some technical and professional groups are most threatened by attempts to change to the kind of a work organization that fosters a more educative work environment. They lack concrete images and habits of thought and behaviour to play constructive roles in such an organization. Training in this new role and practice in a supporting atmosphere is essential for establishing a learning climate.

A climate of sharing – particularly information-sharing – is a fundamental part of this climate. It serves not only to keep everyone informed and feeling part of the organization, but it contributes to the generation of *new* knowl-

edge resulting from interactions of those involved in work on facilities design or redesign, new product development, etc.

Thus, a *modus operandi* of such an organization should be: All knowledge that workers feel they need should be made available short of compromising the enterprise's competitiveness or real need for confidentiality. With the development of the profusion of monitors and computers in the work processes in most sectors of the economy, rapid and broad access to information is possible. All this acts to create a climate of continually raising the level of understanding and efficiency of the entire work force in relation to the whole work process.

Blocks to developing educative work environments

Some characteristics of organizations hinder realization of maximizing learning in the workplace. When workers' participation programmes are introduced into an enterprise, workers often discover how the artificial and rigid divisions of many workplace professions hinder knowledge flow. Work is split into 'knowing', 'doing' and 'being' (Arendt, 1958). Workforces are assigned mainly to 'doing'; support staffs are assigned to 'knowing'; and executives to 'being' the organization. All three functions should be built into *each* person's job.

Another split discovered by participation programmes is the labour, planning and action split. Workers labour, staffs design and managers act. Again, an educative work environment requires that each job involves all three types of effort.

A further split stems from the tendency of certain cultures to seek and value technocractic solutions. There is a distinct bias towards prefabricated 'right answer' structural 'solutions'. Although an ongoing process is needed to develop the viability and vitality of the enterprise as well as its workers at all levels, technocrats freeze democratic processes and support particular structural components and configurations of those components that are considered 'right'. This style is in fundamental contradiction to the empowerment process and the evolutionary development of organizations' future directions.

At odds with the vision of 'work as part' has been, historically, a vision of 'work as whole'. This vision challenges work to be as full and rich an experience as any other part of life and refuses to 'trade off' work with the rest of life, but rather to incorporate in work the full social dynamics of life.

These splits – knowing, doing, being; labour, work, action; work as part, work as whole – are among the first blocks encountered and overcome in the personal empowerment journeys of all members of an organization. In the

participatory management programmes companies tried out in the 1960s and 1970s, 'doing' without 'knowing' was instantly attacked when workers used the knowledge they already had for years about the workplace to improve both working conditions and company productivity. Much of Japanese success relative to US and European producers has been due to a more than fifteen year-long campaigns creating dozens of structures in the workplace for asking the whole Japanese workforce, 'How can we best manufacture our products?'. This approach was effective because workers were also asked to implement the process designs they developed. The split between knowing and doing was thus overcome.

Another hindrance to the learning-conscious organization that has been uncovered by participation projects is the 'hoarding' of information by managers, professionals and technicians. Facts, strategies and plans are hoarded by managers for their career-building purposes, and an information flow to workers is restricted. Some workers' participation programmes have confronted this issue directly, forcing basic information to be made available to the workforce. New programmes such as participation programmes and participatory management have also been 'hoarded' by managers who may use them for their own career advancement rather than for the benefit of workers and the enterprise as a whole. An even greater problem is the managerial tendency to coopt and control these participation programmes and institutionalize a management version before workers can either design and implement their version, or before a joint endeavour is developed.

The barriers are of equal importance to management and to labour. Unions, boards of directors, workers, professional staff, managers – all can and must learn new attitudes and new ways of thinking about the organization and all of its human potential if work organizations are to maximize opportunities for worker learning. This learning itself can take place in structures that include all these relevant groups and that focus on problems to be solved in the workplace.

Design implementation continuum as a learning process

One of the fundamental differences between Japanese and American workplaces that one can validly generalize about without too much distortion is the greater number of people involved in designing systems in the Japanese case. The involvement of ordinary blue-collar workers in design of the equipment they work on, such that they specify the features and even go so far as to engineer some of the features that the next generation of their equipment will have, transforms their relation to the workplace overall.

The implications of design involvement for worker empowerment are

manifold. First, design involvement splits worker jobs into an active and a reflective component. The active component is performing work in the work system. The reflective component is tinkering with the design of the work system so as to improve the work process and result. Second, design involvement transforms the relation between skilled professionals in the workforce and unskilled ordinary workers. The skilled professionals serve not as the repository of essential knowledge, but as a resource for facilitating worker learning. Systems exist in Japanese firms for assisting this transformation. PhDs are told upon hire in major Japanese firms that there is little likelihood their work will involve directly their specialty PhD area of knowledge. However, the PhDs will be invited to serve as 'question answerers' in their field and tutors of personnel on specific projects. Except for this learning-resource activity the degree is treated as general mental training rather than as body of knowledge attained. This is one example of a powerful system for transforming skilled professional workers into a resource for worker learning, rather than a sole monopoly of expert knowledge. Third, involvement of workers in design adds research, experiment and knowledge discovery functions to jobs that formerly involved the rote carrying out of instruction some remote expert pre-designed. Some workers are told their 'job' is both to perform and to automate their job. Lifetime employment in Japan reduces any anxiety that automating their current job will adversely affect their future employment. Fourth, worker involvement in design requires a knowledge updating component to all ordinary jobs, since good design of systems requires current knowledge of technical means of realizing job functions. A skilled workforce in this sense becomes a workforce whose knowledge is current.

Proactive union role for learning environments

Unions can be important instruments in bringing about educative work environments. Through appropriate collective bargaining, legislation and workers' education policies and practices, they can affect the processes, work organization structures, and overall climate for enabling learning. A strong union can play a proactive role as a countervailing force to the traditional techno-engineering tendency to reduce, if not to eliminate, meaningful human work in the design of new work processes and technology.

Recently, many managers have realized that these systems have high costs in failure rates. As a result, they have become more amenable to designing some human endeavour back into the work process. This new awareness gives unions a better opportunity to assert an active role for their members in decisions on technological choices and the nature of the jobs in the

consonant work organization.

For many unions, however, there is the dilemma that 'learningful' jobs may call for practices such as rotation, teaching and learning each others' jobs, as well as pay systems based on how many jobs a person has learned. This has an impact on traditional seniority and job classification systems. Unions are faced with the challenge of mediating these changes and gaining strong job security guarantees for underwriting more of an information and skill-sharing atmosphere since workers are often reluctant to teach what they have learned if they think it will threaten their jobs. Unions must also protect the accumulated rights of those members who may not want to change work practices.

Conclusion

This chapter has focused on non-formal education processes as potentially powerful tools for developing educative work environments. It has presented a model, for workers' learning, incorporating a synthesis of empowerment learning theory and adult learning theory as adapted to workplaces. We have traced the implications of such a model for enterprises developing into organizations that intentionally build worker learning into the design and implementation of work and decision processes, technology and work facilities, and have identified some of the barriers to realizing such a structure.

Increased learning through participative empowerment processes can make a fundamental contribution to organizational effectiveness since confident workers are competent workers.

Additionally, however, a democratic society needs autonomous people who can take initiative, assume greater responsibility, and help solve critical problems. As indicated, increasingly autonomous workers desiring more influence is another result of these workplace learning processes (Gardell, 1982; Ressner and Gunnarson, 1986). In the process, traditional authority and power relationships are often fundamentally challenged (C.F.Derber and Schwartz, 1981). In many traditional and bureaucratic enterprises, unions often will need to be the instrument for bringing about this kind of sustained change if it is to happen at all.

These psycho-social dynamics of workplace learning processes are also an important aspect of the healthy work environment since they embody increased worker personal development and workers' ability to influence their work situation and workplace goals. Swedish industrial psychologist Bertil Gardell, whose empirical research helped establish the relationship between worker autonomy and mental health (1981), has stated a philosophy

of working life research when he writes, 'I think it is necessary to anchor research not in economic, but in social and humanistic values, where health, well being, and the use of creative resources are fundamental goals in their own right' (1981, pp.10,11).

In a similar vein, the opportunity for workers to learn at work should be, in its own right, a fundamental goal.

Note

1. Many of the findings of this study paralleled those in the Almex study by Gardell and Swensson (1981).

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Anyone desiring to make sense of the vast literature on organisational theory and the quality of work life could do worse than to start with Alvesson. This book is informed by a critical social tour of the major issues pertaining to subjects such as personality, adjustment and work organisation or organisations, culture and ideology. A solid, if inelegant, text.

Braverman, H. *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century.* Monthly Review Press, New York, 1974.

Braverman is an essential starting point for anyone wanting to understand the meaning, or meaninglessness, of work in the twentieth century. His book has served as a touchstone for much contemporary scholarly reflection on the developmental possibilities of the workplace. Though low key in tone, Braverman's highly influential book echoes Marx's impassioned denunciation of the stultifying nature of work in *Capital*.

Heron, C. & Storey, R. (eds). *On the Job: Confronting the Labour Process in Canada.* McGill-Queen's Press, Montreal, 1986.

This collection is a fine example of the high calibre of contemporary labour history. Heron and Storey's introductory essay nicely illustrates how an historical perspective on the evolution of capitalist labour processes can help us recover the subjective dimension of history. Men and women, these essays reveal, have resisted the undermining of their collective competence and fought innumerable battles to humanise their work environments.

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Hirschhorn is part of group of former New Left thinkers who are exploring the emancipatory possibilities of postindustrial society. This is rather refreshing, since there is a great deal of pessimism about current thinking on job reorganisation. Hirschhorn does not simply invert Braverman's gloomy prognosis of capitalism, rather, he argues that cybernetic technologies have rendered Taylorism obsolete, and opened up historic possibilities for developmental, learner-centred work. Postindustrial society has placed qualitative concerns on its agenda, and adult educators and social activists must not miss emergent opportunities.

Howard, R. *Brave New Workplace*. Penguin, New York, 1986.

Howard's journalistic jeremiad against the computerised workplace makes for depressing reading. He does not bother with the usual scholarly apparatus, and relentlessly provides example after example of how work in postindustrial workplaces increases managerial control over people and the work process. This book is an antidote to the inflated claims of contemporary management ideologue. But Howard is telling only one side of the story.

Kelly, J. *Scientific Management, Job Redesign and Work Performance*. Academic Press, New York, 1982.

This text is perhaps the most lucid account of the job redesign literature in the English language. Kelly gives an excellent account of Taylorism and the origins and assumptions of classical job redesign. He provides equally superb analyses of flowline reorganisation and mass production, flexible work groups in the continuous-process industries and vertical role integration. This book is a very important contribution toward understanding the workplace as a learning environment.

Leymann, H. & Kornbluh, H. (eds). *Socialization and Learning at Work*. Gower, Brookfield, Vt, 1989.

These original essays reflect the emergence of a new paradigm that moves beyond conventional ideas about the education and training of workers to an analysis of the workplace as a curricular structure in itself. The central concept guiding this book is the 'educative workplace'. The analyses here represent a significant departure for the field of adult education, which has been plagued by individualistic modes of thinking about the learning process. Although uneven in style and analytical focus, this is one of the more important adult education texts in recent years.

Pateman, C. *Participation and Democratic Theory*. Cambridge University Press, London, 1970.

Since the publication of this seminal text, Pateman has integrated explicitly feminist perspectives into her work. A fine example of her recent work is *The Disorder of Women* (Stanford University Press, Paulo Alto, Calif., 1989). But this 1970 text is still required reading for those interested in creating the participatory, educative workplace. Pateman has not deviated from her commitment to linking participation in the workplace with the sense of political efficacy.

Watkins, P. *High Tech, Low Tech and Education*. Deakin University, Geelong, Vic., 1986.

Watkins challenges the widely circulated idea that high technology industries will create many new and stimulating jobs. He maintains that Taylorism is still the pre-eminent approach to work organisation, and illustrates his argument through a careful review of literature on work organisation in Silicon Valley. Watkins extends the Bravermanian thesis to high technology work sites.

Wood, S. (ed.) *The Degradation of Work?: Skill, Deskilling and the Labour Process*. Hutchinson, London, 1982.

Wood has assembled a series of competent essays that examine Braverman's

deskilling thesis. These British case studies challenge Braverman's determinism, and paint a more complex picture of the organisation of work and working-class composition than Braverman offers.

ACKNOWLEDGMENTS

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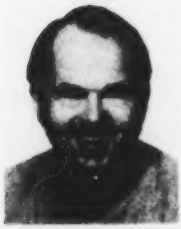
ABOUT THE AUTHOR



Michael R. Welton received his B.A. and M.A. in Anthropology and Ph.D. in Educational Studies from the University of British Columbia. He has taught in many different settings (secondary school, community college, university) and published numerous articles on the history of adult education and social theory. His book, *Knowledge for the People*, was published in 1987. Since 1982 he has been a Professor of Adult Education in the School of Education, Dalhousie University, Halifax, Nova Scotia.

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ISBN 0 7300 1354 5
Cat. no. EEE701M03